CHAPTER 23

COMMUNICATIONS

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively.

Remove and insert the affected pages and complete the Record of Revisions and the Record of Temporary Revisions as necessary



CHAPTER 23

COMMUNICATIONS

LIST OF EFFECTIVE PAGES

N, R or D indicates pages which are New, Revised or Deleted respectively.

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CH/SE/SU	C		PAGE	DATE	CH/SE/SU	C		PAGE	DATE
S.B. LIST			1	Feb 28/79	23-00-00	02		21	Mar 27/97
S.B. LIST			2	Feb 28/79	23-00-00	02		22	Mar 27/97
S.B. LIST			3	Nov 30/80	23-00-00	02		23	Nov 30/80
S.B. LIST			4	Nov 30/81	23-00-00	02		24	Nov 30/80
S.B. LIST			5	Sep 30/93	23-00-00	02	R	25	May 31/03
					23-00-00	02	R	26	May 31/03
T. of C.			1	Mar 31/00	23-00-00	02		27	Nov 30/80
T. of C.			2	Mar 31/00	23-00-00	02	R	28	May 31/03
T. of C.			3	Mar 31/00	23-00-00	02		29	Nov 30/80
T. of C.			4	Mar 31/00	23-00-00	02		30	Nov 30/80
T. of C.			5	Mar 31/00	23-00-00	02		31	Nov 30/80
T. of C.			6	Mar 31/00	23-00-00	02		32	Nov 30/80
T. of C.			7	Mar 31/00	23-00-00			301	Aug 30/79
T. of C.			8	Mar 31/00	23-00-00			302	Aug 30/80
T. of C.			9	Mar 31/00	23-00-00			401	Nov 30/79
T. of C.			10	Mar 31/00	23-00-00			402	Nov 30/79
T. of C.			11	Mar 31/00	23-00-00			403	Nov 30/79
T. of C.			12	Mar 31/00	23-00-00			404	Nov 30/79
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23-00-00	02		2	Nov 30/79	23-00-00			407	Nov 30/79
23-00-00	02		3	Mar 27/97					
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23-00-00	02		6	Nov 30/80	23-11-00			3	Aug 30/80
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23-00-00	02	R	18	May 31/03	23-11-00			15	Aug 30/80
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CH/SE/SU	C	PAGE	DATE	CH/SE/SU	C	PAGE	DATE
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23-31-32		403	Feb 28/77
23-31-32		404	Feb 28/81
23-31-32		405	Nov 30/80

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23-31-34	01	504	Sep 30/87	23-41-00	02	7	Mar 31/95
23-31-34	02	501	Sep 30/87	23-41-00	02	8	Mar 31/95
23-31-34	02	502	Sep 30/87	23-41-00	02	9	Mar 31/95
23-31-34	02	503	Sep 30/87	23-41-00	02	10	Mar 31/95
				23-41-00	02	11	Mar 31/95
23-32-00		1	Mar 31/95	23-41-00	02	12	Mar 31/95
23-32-00		2	Mar 31/95	23-41-00	02	13	Mar 31/95
23-32-00		3	Mar 31/95	23-41-00	02	14	Mar 31/95
23-32-00		4	Mar 31/95	23-41-00	02	15	Mar 31/95
23-32-00		5	Mar 31/95	23-41-00	02	16	Mar 31/95
23-32-00		6	Mar 31/95	23-41-00	02	17	Mar 31/95
23-32-00		7	Mar 31/95	23-41-00	02	18	Mar 31/95
23-32-00		8	Mar 31/95	23-41-00	02	19	Mar 31/95
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23-32-00		11	Mar 31/95	23-41-00	02	22	Mar 31/95
23-32-00		12	Mar 31/95	23-41-00	02	23	Mar 31/95
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23-32-00		15	Mar 31/95	23-41-00	02	26	Mar 31/95
23-32-00	02	101	Nov 30/84	23-41-00	02	27	Mar 31/95
23-32-00	02	102	Nov 30/79	23-41-00	02	28	Mar 31/95
23-32-00	02	103	Nov 30/84	23-41-00	02	29	Mar 31/95
23-32-00	02	104	Nov 30/85	23-41-00	02	30	Mar 31/95
23-32-00	02	105	Nov 30/84	23-41-00	02	31	Mar 31/95
23-32-00	02	106	Nov 30/84	23-41-00	02	32	Mar 31/95
23-32-00	02	107	Mar 31/95	23-41-00	02	33	Mar 31/95
23-32-00	02	108	Mar 31/95	23-41-00	02	34	Mar 31/95
23-32-00	02	109	Mar 31/95	23-41-00	02	35	Mar 31/95
23-32-00	02	501	Nov 30/84	23-41-00	02	36	Mar 31/95
23-32-00	02	502	Nov 30/84	23-41-00	02	37	Mar 31/95

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23-41-00	02	39	Mar 31/95	23-41-00	02	135	Nov 30/80
23-41-00	02	40	Mar 31/95	23-41-00	02	136	Nov 30/80
23-41-00	02	41	Mar 31/95	23-41-00		201	Nov 30/81
23-41-00	02	42	Mar 31/95	23-41-00	02	501	Feb 28/81
23-41-00	02	43	Mar 31/95	23-41-00	02	502	Feb 28/81
23-41-00	02	44	Mar 31/95	23-41-00	02	503	Feb 28/81
23-41-00	02	45	Mar 31/95	23-41-00	02	504	Feb 28/81
23-41-00	02	46	Mar 31/95	23-41-00	02	505	Feb 28/81
23-41-00	02	47	Mar 31/95	23-41-00	02	506	Feb 28/81
23-41-00	02	48	Mar 31/95	23-41-00	02	507	Feb 28/81
23-41-00	02	49	Mar 31/95	23-41-00	02	508	Nov 30/80
23-41-00	02	50	Mar 31/95	23-41-00	02	509	Feb 28/81
23-41-00	02	51	Mar 31/95	23-41-00	02	510	Nov 30/80
23-41-00	02	52	Mar 31/95	23-41-00	02	511	Nov 30/80
23-41-00	02	53	Mar 31/95	23-41-00	02	512	Nov 30/80
23-41-00	02	54	Mar 31/95	23-41-00	02	513	Nov 30/80
23-41-00	02	101	Feb 28/81	23-41-00	02	514	Aug 30/81
23-41-00	02	102	Feb 28/81	23-41-00	02	515	Aug 30/81
23-41-00	02	103	Nov 30/80	23-41-00	02	516	Aug 30/81
23-41-00	02	104	Nov 30/80	23-41-00	02	517	Aug 30/81
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23-41-00	02	108	Nov 30/80	23-41-00	02	521	Aug 30/81
23-41-00	02	109	Nov 30/80	23-41-00	02	522	Aug 30/81
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23-41-00	02	111	Nov 30/80	23-41-00	02	524	Aug 30/81
23-41-00	02	112	Nov 30/80	23-41-00	02	525	Aug 30/81
23-41-00	02	113	Nov 30/80	23-41-00	02	526	Aug 30/81
23-41-00	02	114	Nov 30/80	23-41-00	02	527	Aug 30/81
23-41-00	02	115	Nov 30/80	23-41-00	02	528	Aug 30/81
23-41-00	02	116	Nov 30/80	23-41-00	02	529	Aug 30/81
23-41-00	02	117	Nov 30/80	23-41-00	02	530	Aug 30/81
23-41-00	02	118	Nov 30/80	23-41-00	02	531	Aug 30/81
23-41-00	02	119	Nov 30/80	23-41-00	02	532	Aug 30/81
23-41-00	02	120	Nov 30/80	23-41-21		401	Feb 28/81
23-41-00	02	121	Nov 30/80	23-41-21		402	Feb 28/81
23-41-00	02	122	Nov 30/80	23-41-21		501	May 30/79
23-41-00	02	123	Nov 30/80	23-41-21		502	Feb 28/81
23-41-00	02	124	Nov 30/80	23-41-21		503	Feb 28/81
23-41-00	02	125	Nov 30/80	23-41-21		504	Nov 30/80
23-41-00	02	126	Nov 30/80	23-41-33		401	May 30/79
23-41-00	02	127	Nov 30/80	23-41-33		402	May 30/79
23-41-00	02	128	Nov 30/80	23-41-41		401	May 30/79
23-41-00	02	129	Nov 30/80	23-41-41		402	May 30/79
23-41-00	02	130	Nov 30/80	23-41-42		401	May 30/78
23-41-00	02	131	Nov 30/80	23-41-42		402	May 30/78
23-41-00	02	132	Nov 30/80	23-41-42		403	May 30/78
23-41-00	02	133	Nov 30/80	23-41-42		404	May 30/78

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23-41-43			404	Aug 30/76
23-41-43			405	Aug 30/76
23-41-44			401	May 30/78
23-41-44			402	May 30/78
23-41-44			403	May 30/78
23-41-44			404	May 30/78
23-41-44			405	May 30/78
23-41-44			501	May 30/78
23-41-44			502	May 30/78
23-42-00			1	Nov 30/80
23-42-00			2	Nov 30/80
23-42-00			3	Feb 28/81
23-42-00	02		101	Feb 28/81
23-42-00	02		102	Nov 30/80
23-42-00	02		103	Nov 30/80
23-42-00	02		104	Nov 30/80
23-42-00	02		105	Nov 30/80
23-42-00	02		106	Nov 30/80
23-42-00	02		107	Nov 30/80
23-42-00	02		108	Nov 30/80
23-42-00	02		109	Feb 28/81
23-42-00			501	Feb 28/81
23-42-00			502	Feb 28/81
23-42-00			503	May 30/76
23-42-00			504	Aug 30/76
23-42-10			401	Feb 28/79
23-42-10			402	Feb 28/79
23-42-10		R	403	May 31/03
23-42-10		R	404	May 31/03
23-42-10		R	405	May 31/03
23-42-10		N	406	May 31/03
23-51-00			1	Jun 30/75
23-60-00			1	Sep 30/93
23-60-00			2	Sep 30/93
23-60-00			401	Sep 30/93
23-60-00			402	Sep 30/93
23-60-00			403	Sep 30/93
23-60-00			404	Sep 30/93
23-60-00			405	Sep 30/93
23-60-00			406	Sep 30/93
23-60-00			407	Sep 30/93
23-60-00			408	Sep 30/93
23-71-00	02		1	Feb 28/81

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23-71-00	02	4	Feb 28/81
23-71-00	02	5	Feb 28/81
23-71-00	02	6	Feb 28/81
23-71-00	02	7	Nov 30/80
23-71-00	02	8	Feb 28/81
23-71-00	02	9	Feb 28/81
23-71-00	02	10	Nov 30/79
23-71-00	02	11	Nov 30/80
23-71-00	02	12	Nov 30/80
23-71-00	02	13	Feb 28/81
23-71-00	02	14	Feb 28/81
23-71-00	02	15	Feb 28/81
23-71-00	02	101	Feb 28/81
23-71-00	02	102	Feb 28/81
23-71-00	02	103	Nov 30/80
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23-71-00	02	110	Nov 30/80
23-71-00	02	111	Nov 30/80
23-71-00	02	112	Nov 30/80
23-71-00	02	113	Nov 30/80
23-71-00	02	114	Nov 30/80
23-71-00	02	115	Nov 30/80
23-71-00	02	501	Feb 28/81
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23-71-00	02	506	Nov 30/80
23-71-00	02	507	Nov 30/80
23-71-00	02	508	Nov 30/80
23-71-00	02	509	Nov 30/80
23-71-00	02	510	Nov 30/80
23-71-13		401	Nov 30/79
23-71-41		401	Feb 28/78
23-71-41		402	Feb 28/78
23-71-41		403	Feb 28/78
23-71-41		501	Nov 30/77
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23-71-52		401	May 30/79
23-71-52		402	May 30/79

SERVICE BULLETIN LIST

In the following service bulletin list, SB indicates an aircraft manufacturers bulletin, AEB indicates an airline engineering bulletin and OL indicates an engine manufacturers bulletin (complete identification OL.593-XX-XXX).

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
AEBAF233011			Not applicable
SB 23-001			Not applicable
SB 23=002			Not applicable
SB 23-002	01		Not applicable
SB 23-003			Not applicable
SB 23-004		May 30/76	Embodied Communications -Cancellation of HF 1 priority
SB 23-004	01		Not applicable
SB 23-004	02		Not applicable
SB 23-004	03		Not applicable
SB 23-005		May 30/77	Embodied Communications. Voice recorder -To prevent 400 Hz noise ingression on the area microphone line
SB 23-005	01		No effect Communications. Voice recorder =To prevent 400 Hz noise ingression on the area microphone line
SB 23-005	02		No effect Communications. Voice recorder -To prevent 400 Hz noise ingression on the area microphone line
SB 23-005	03		No effect Communications. Voice recorder -To prevent 400 Hz noise ingression on the area microphone line
SB 23-006		Aug 30/78	Embodied Communications - Technological modification of HF antenna tuner and selector units
SB 23-006	01		No effect Communications - Technological modification of HF antenna tuner and selector units
SB 23-006	02		No effect Communications - Technological modification of HF antenna tuner and selector units
SB 23-007			Not applicable
SB 23-008		Nov 30/76	Embodied Communications -Modification to the tape

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			reproducer announcement and music circuit connections (Arinc 539-A-1).
SB 23-008	01		No effect Communications -Modification to the tape reproducer announcement and music circuit connections (Arinc 539-A-1).
SB 23-008	02		No effect Communications -Modification to the tape reproducer announcement and music circuit connections (Arinc 539-A-1).
SB 23-008	03		No effect Communications -Modification to the tape reproducer announcement and music circuit connections (Arinc 539-A-1).
SB 23-009		Feb 28/77	Embodied Communications -H.F. system _ H.F. antenna coupler connectors
SB 23-010			Not applicable
SB 23-011			Embodied Communications -Modification to flight compartment loudspeaker muting circuit
SB 23-011	01		No effect Communications -Modification to flight compartment loudspeaker muting circuit
SB 23-012			Not applicable
SB 23-012	01		Not applicable
SB 23-012	02		Not applicable
SB 23-012	03		Not applicable
SB 23-013			Embodied Communications -Addition of capacitors and fuses in the interphone amplifier unit
SB 23-013	01		Embodied Communications -Addition of capacitors and fuses in the interphone amplifier unit
SB 23-013	02		Embodied Communications -Addition of capacitors and fuses in the interphone amplifier unit
SB 23-014			No effect Communications -Replacement of Gego loud-speakers by Audax INV 10/15 B.I. in the toilets
SB 23-014	01		No effect Communications -Replacement of Gego loud-speakers by Audax INV 10/15 B.I. in the

SERVICE BULLETIN LIST

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			toilets
SB 23-015			Not applicable
SB 23-015	01		Not applicable
SB 23-015	02		Not applicable
SB 23-016			No effect
			Communications -To improve security of static discharger attachment
SB 23-017			No effect
			Communications -Modification to static discharger installation
SB 23-018			Embodied
			Communications -Replacement of Chelton static dischargers 2.17 SC by 2.17 SSC
SB 23-018	01		No effect
			Communications -Replacement of Chelton static dischargers 2.17 SC by 2.17 SSC
SB 23-018	02		No effect
			Communications -Replacement of Chelton static dischargers 2.17 SC by 2.17 SSC
SB 23-019			Embodied
			Communications. Pilot's Ground Call -To reposition the pilot's ground call warning horn
SB 23-019	01		Embodied
			Communications. Pilot's Ground Call -To reposition the pilot's ground call warning horn
SB 23-019	02		No effect
			Communications. Pilot's Ground Call -To reposition the pilot's ground call warning horn
SB 23-020			No effect
			Communications -High frequency (HF) -To add by-pass capacitors to radio frequency (RF) sensitivity line
SB 23-020	01		No effect
			Communications - High Frequency (H.F.) - To add By-Pass Capacitor to radio frequency (RF) sensitivity line
SB 23-021			No effect
			Communications. Tape Reproducer - To add earth strap
SB 23-022			Not applicable
SB 23-023			No effect

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SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
			Communications - Replace GEGO loudspeakers in toilets by AUDAX CIS 7c 2.5 ohms loud-speakers (Variant to modification 1317)
SB 23-024		Aug 30/80	Embodied
			Communications - Provide means for recor-ding HF tuner unit pressure drop in flight
SB 23-025		Aug 30/79	Embodied
			Communications. Voice Recorder - To up-grade flight deck reception to accepta-ble levels. (Mandatory for U.S. Operators)
SB 23-025	01		Embodied
			Communications. Voice Recorder - To up-grade flight deck reception to accepta-ble levels. (Mandatory for U.S. Operators)
SB 23-025	02		Embodied
			Communications. Voice Recorder - To up-grade flight deck reception to accepta-ble levels. (Mandatory for U.S. Operators)
SB 23-025	03		No effect
			Communications. Voice Recorder - To up-grade flight deck reception to accepta-ble levels. (Mandatory for U.S. Operators)
SB 23-025	04		No effect
			Communications. Voice Recorder - To up-grade flight deck reception to accepta-ble levels. (Mandatory for U.S. Operators)
SB 23-025	05		No effect
			Communications. Voice Recorder - To up-grade flight deck reception to accepta-ble levels. (Mandatory for U.S. Operators)
SB 23-026		Aug 30/81	Embodied
			Communication. Selcal - To increase tone level when audio warning system is inhibited
SB 23-026	01		No effect
			Communication. Selcal - To increase tone level when audio warning system is inhibited

SERVICE BULLETIN LIST

SB/AEB NO	REV	INC. IN REVISION	DESCRIPTION
SB 55-010		Sep 30/93	Embodied Stabilizers - Rudder - Design improvements to upper and lower rudder assemblies.

CHAPTER 23

COMMUNICATIONS

TABLE OF CONTENTS

PRINTED IN ENGLAND

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GENERAL - DESCRIPTION AND OPERATION

1. General

The crew members are provided with communication equipment which allows :

A. Voice radio communication between the aircraft and the ground radio stations or other aircraft.

B. Voice intercommunication between :

- Crew members
- Crew members and stewards
- Crew members plus stewards and ground personnel
- Crew members plus stewards and passengers, using the public address and entertainment channel

C. Permanent recording of conversations between crew members by means of the cockpit voice recorder

2. System Components
(Ref. Fig. 001)

The radio communication equipment consists of :

A. The radio equipment

(1) High frequency (HF) system

Two transceivers and the associated equipment provide voice communication in the 2 to 30 MHz frequency range. An interlock system prevents both systems from operating simultaneously.

(2) Very high frequency (VHF) system

Two transceivers and the associated equipment provide voice communications in the 118 MHz to 150 MHz frequency range.

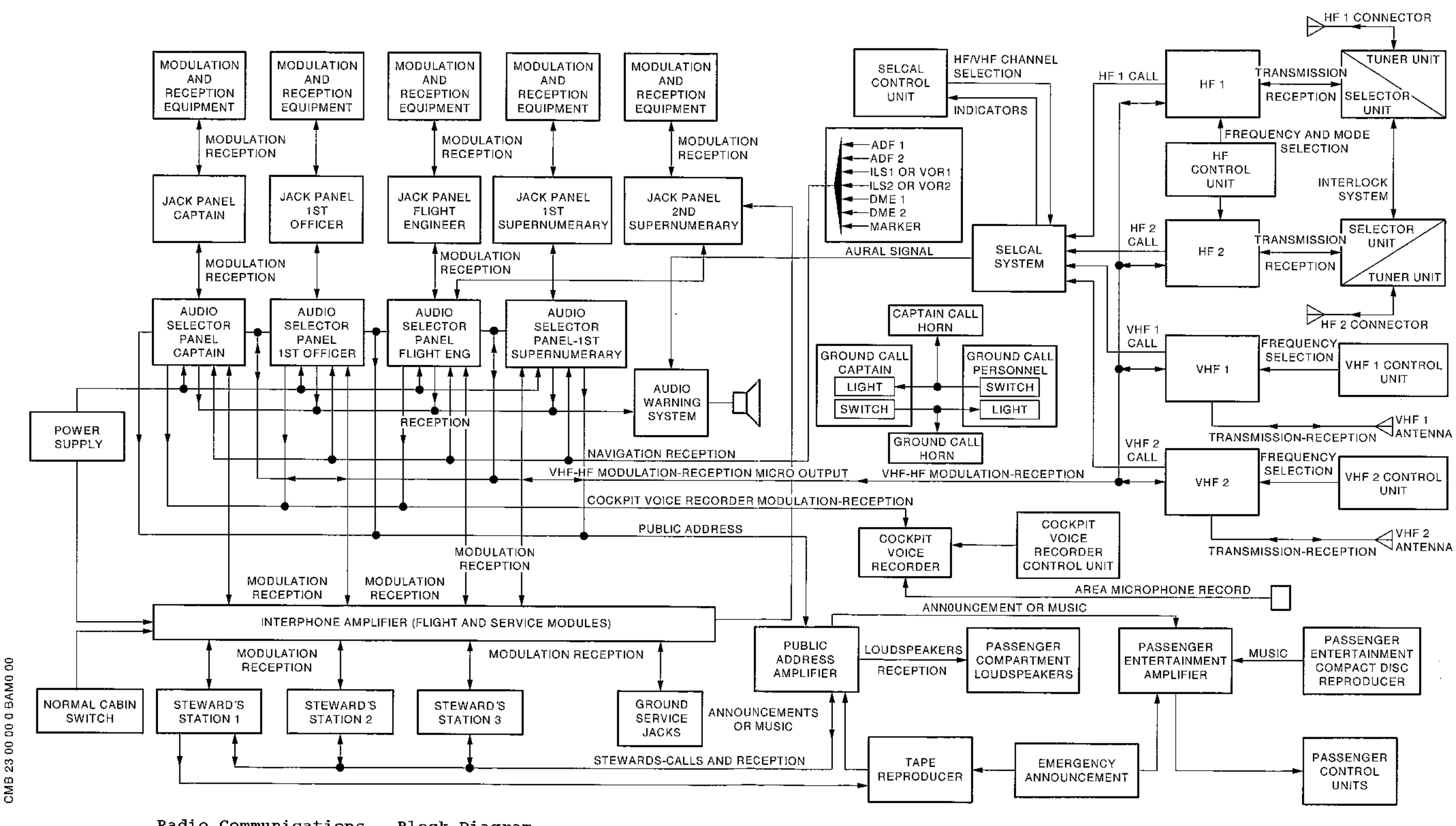
(3) Selective calling (SELCAL) system

A decoder allows a ground station, using a code, to call one particular aircraft among several others, through either the HF or VHF system.

B. Interphone system

The interphone system provides intercommunication between

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R Radio Communications - Block Diagram
Figure 001

the various crew members. It also includes all reception and modulation controls on audio selector panels, whereby one or several reception channel(s) may be selected and mixed, and a transmitter or the intercommunication system may be set to operate.

C. Public Address System

The public address system is assigned two functions:

(1) It provides the crew members or the stewards with the possibility of broadcasting announcements or instructions to passengers.

(2) It allows broadcasting of pre-recorded announcements or music programs on a tape reproducer.

D. Passenger Entertainment System

(1) It provides each passenger with the possibility of selecting individually either monaural or stereophonic
R music programs pre-recorded in a compact disc reproducer.

(2) It provides each passenger with the possibility of listening directly at the headphones to the announcements transmitted by the public address system.

E. Cockpit Voice Recorder

By means of an endless loop magnetic tape, the cockpit voice recorder records all crew conversations held and all radio communications received and keeps the last 30 minutes of the record.

F. Antennas

All radio antennas are mounted flush with the structure, except the VHF antennas which protrude from the fuselage.

G. Electronics Racks

Most radio equipment is installed in the electronics racks located in the forward section of the fuselage, between Frames 4 and 11, and in racks located in the rear section of the fuselage, at Frame 72.
This equipment is mounted on air-cooled shelves.

3. Flight Compartment Preparation Check

A. At Captain's console :

(1) On loudspeaker control panel,

- LOUDSPEAKER ON-OFF switch placed in OFF position

(2) On jack panel :

- Hand microphone connected to HAND MIC jack
- Boomset connected to HEADSET and MIC jacks

B. On Captain's and First Officer's control columns :

(1) PTT switches
- RAD-INT PTT switches placed in intermediate position

C. At centre console

(1) On Captain's and First Officer's audio selector panels :

- On keyboard, all transmission keys disengaged and integral lights all extinguished
- Reception push-buttons all disengaged except the INT push-button which is engaged and illuminated with the integral potentiometer set to the intermediate position
- VOICE push-button disengaged and extinguished
- R/T-INT PTT switch placed in INT position
- BOOM-MASK switch placed in BOOM position.

(2) On Selcal control unit :

- MARKER HI-LO switch placed in HI position
- SELCAL 1 function selector switch placed in VHF1 position
- SELCAL 2 function selector switch placed in VHF1 position
- SELCAL indicator lights pressed successively, which entails in turn illumination of the indicator light. Reduce brightness of the light by turning indicator light cap.

(3) On Captain's and First Officer's VHF control units :

- On frequency display windows, the frequencies are displayed by means of display control knobs
- TFR switch placed as required with associated window and green light corresponding to the position of

switch illuminated

(4) On HF dual control unit

- Function selector switches placed in OFF position
- On frequency display windows, the frequencies are displayed by means of display control knobs
- RF SENS potentiometer set to intermediate position

D. On First Officer's console :

(1) On loudspeaker control panel :
- LOUDSPEAKER ON-OFF switch placed in OFF position

(2) On jack panel :
- Hand microphone connected to HAND MIC jack
- Boomset connected to MIC and HEADSET jacks

E. On overhead panels :
- GRND CALL push-button released
- I/PHONE CABIN-NORMAL switch placed in CABIN position
- STEWARD CALL push-button released
- FASTEN SEAT BELTS switch placed in OFF position
- NO SMKG switch placed in OFF position
- AUDIO CANCEL push-button released

F. On Flight Engineer's console

(1) On interphone panel :

- SERVICE I/PHONE switch placed in GROUND position

(2) On jack panel :

- Hand microphone connected to HAND MIC jack
- Boomset connected to MIC and HEADSET jacks

(3) On audio selector panel :

- On keyboard all transmission keys disengaged and integral lights all extinguished
- Reception push-buttons all disengaged except INT push-button which is engaged and illuminated, with the integral potentiometer set to the intermediate position
- VOICE push-button disengaged and extinguished
- R/T-INT push-to-talk switch placed in INT position
- BOOM-MASK switch placed in BOOM position

(4) On cockpit voice recorder control unit

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- ERASE push-button released
- TEST push-button released
- galvanometer reading zero
- jack disconnected

G. On First Supernumerary's panel :

(1) On audio selector panel :

- On keyboard, all transmission keys disengaged and integral lights all extinguished
- Reception push-buttons all disengaged except INT push-button which is engaged and illuminated with the integral potentiometer set to the intermediate position
- VOICE push-button disengaged and extinguished
- R/T-INT push-to-talk switch placed in INT position

(2) On jack panel :

- Hand microphone connected to HAND MIC jack
- Boomset connected to HEADSET and MIC jacks

(3) PTT switch on panel

- RAD-INT PTT switch placed in intermediate position

(4) On oxygen panel :

- PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position.

H. On Second Supernumerary's panel :

(1) On jack panel :

- Hand microphone connected to HAND MIC jack
- Boomset connected to HEADSET and MIC jacks

(2) Switches on panel

- RAD-INT PTT switches placed in INT position
- BOOM-MASK switch placed in BOOM position

I. At Steward's Station 1

(1) On tape reproducer control unit :

- Announcement legend card on board
- VOLUME-OFF potentiometer turned counterclockwise in OFF position

- CANCEL push-button released
- Announcement selection push-buttons (from 1 to 12) released
- WAIT indicator lights extinguished
- ENT ON-OFF switch placed in OFF position

(2) On call display and light control panel

- Call lights extinguished
- PASS STEREO switch in OFF position.

(3) On call display panel

- Hand microphone connected
- Boomset connected
- Call lights extinguished

J. At Steward's Station 2

(1) On call and control panel

- Boomset connected
- Hand microphone connected
- Call lights extinguished

K. At Steward's station 3

(1) On call and control panel

- Boomset connected
- Hand microphone connected
- Call lights extinguished

L. In passenger compartment and toilets

(1) Call push-buttons

- PASSENGER CALL push-buttons released and extinguished
- TOILET CALL push-buttons released and extinguished

M. On interphone box on nose landing gear

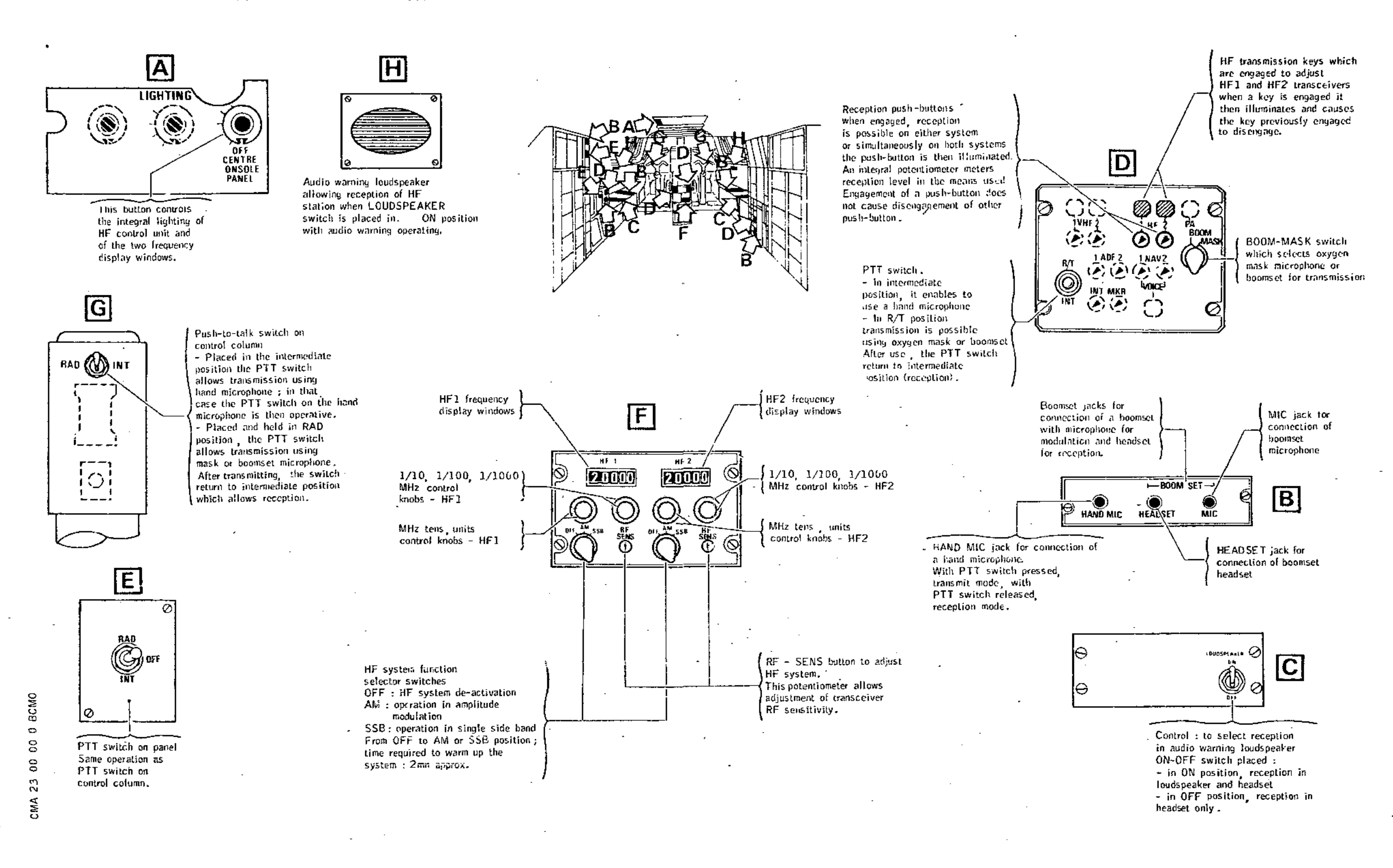
- Boomset connected to jack
- Call push-button released
- Call light extinguished

4. System Management
(Ref. Fig. 002, 003 and 004)
(Ref. Fig. 005)
(Ref. Fig. 007)

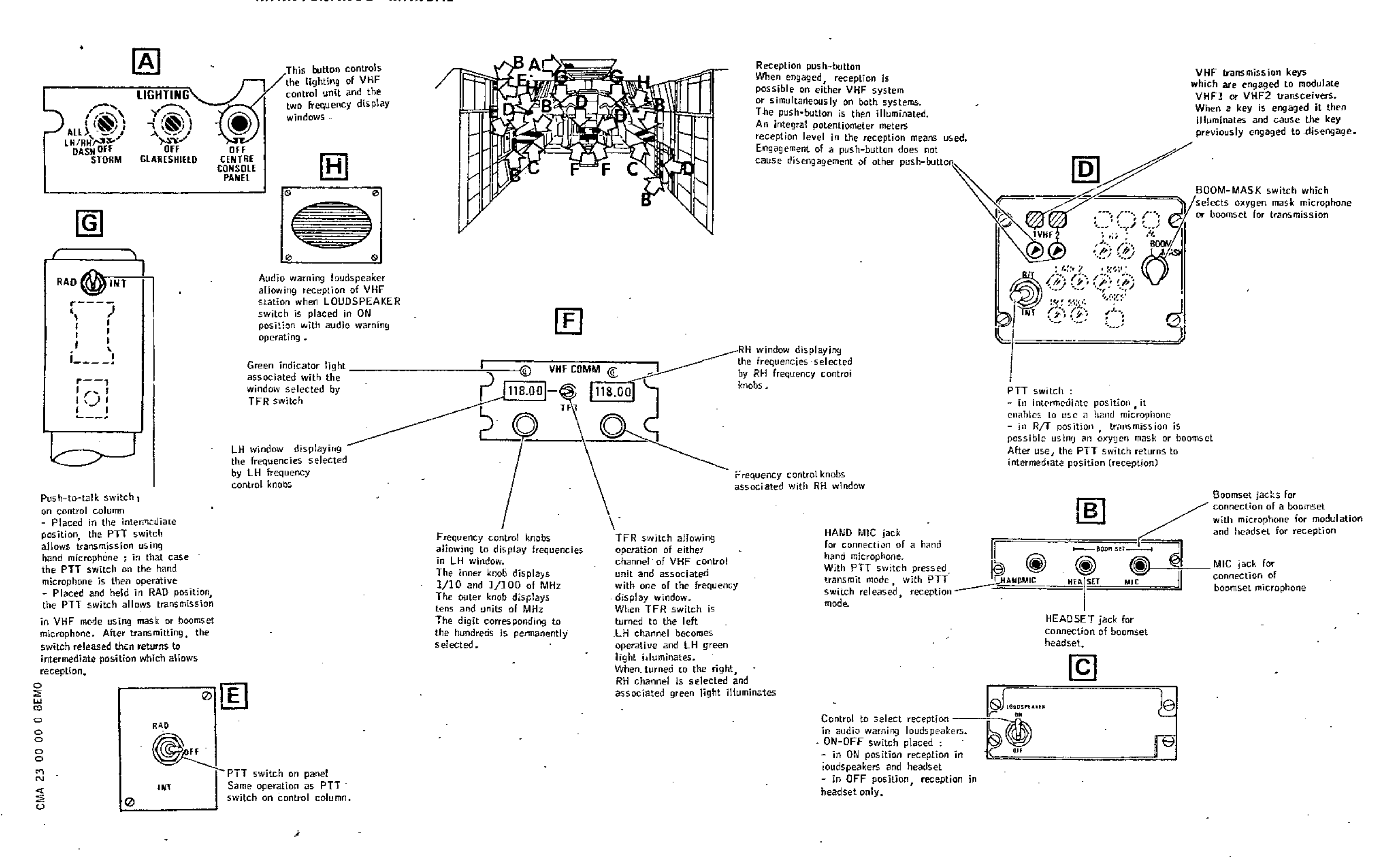
(Ref. Fig.008 and 009)
(Ref. Fig. 006)

The management of the various systems which form the communication means is achieved through control units, switches, function selector switches, push-buttons and indicator lights installed in the flight compartment on side and centre consoles, on Flight Engineer's console and on First and Second Supernumerary's panels.

Exception is taken for the management of the public address and interphone system a part of which is performed from the Stewards' stations, from the passenger compartment, the toilets and the ground service jacks.



HF - System Management
Figure 002



VHF - System Management
Figure 003

A

AUDIO CANCEL | ENGINE FIRE | CONTROLS | AUDIO CANCEL

AUDIO CANCEL push-buttons. When one of the push-buttons is pressed, the audio warning heard in the loudspeaker is cancelled while the visual warning remains activated.

B

LIGHTING

OFF
CENTRE
CONSOLE
PANEL

This button controls the integral lighting of SELCAL control unit. When in OFF position, the lighting is desactivated.

C

Audio warning loudspeaker providing a 300Hz frequency aural warning during 1 second and repeating every second later.

D

RAD | INT

Push-to-talk switch on control column :
- Placed in RAD position during transmission in HF or VHF mode, all aural and visual warnings are cancelled.

G

RAD
OFF
INT

PTT switch on panel. Same operation as PTT switch on control column

E A B A
G C C
F
G F
E E E
E

SELCAL 1 and SELCAL 2 push-buttons with integral amber lights
- The light flashes when ground call in HF or VHF band complies with aircraft SELCAL coding. This action is followed by an aural warning received in the audio warning loudspeakers.
- If the light flashes on completion of a call and if SELCAL push-button is pressed, aural and visual warnings are cancelled. The amber light illuminates continually and as soon as it is released, it extinguishes.
- When pressed SELCAL light illuminates continually and when rotated counterclockwise, the light is dimmed, when rotated clockwise the light is brighter.

H

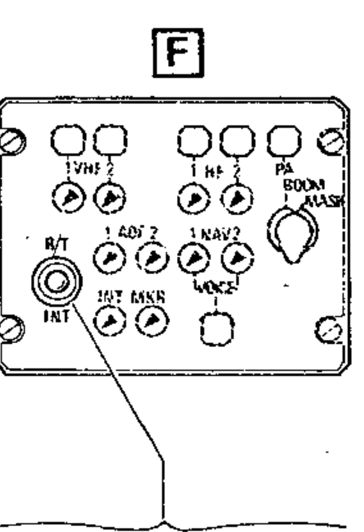
MARKER
LO HI
SEL CAL
SELCAL 1
SELCAL 2

Mode selector switch channel 1, which selects HF or VHF mode in this channel, then either system 1 or 2.

Mode selector switch channel 2, which selects HF or VHF band then either system 1 or 2

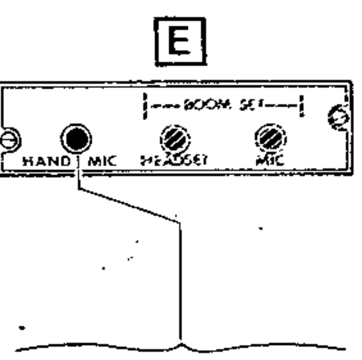
MARKER sensitivity switch.
- In HI position, the receiver sensitivity is increased
- in LO position, sensitivity

F



When the PTT switch on the audio selector panel is placed and held in RADIO position to transmit in HF or VHF band aural and visual warnings are cancelled.

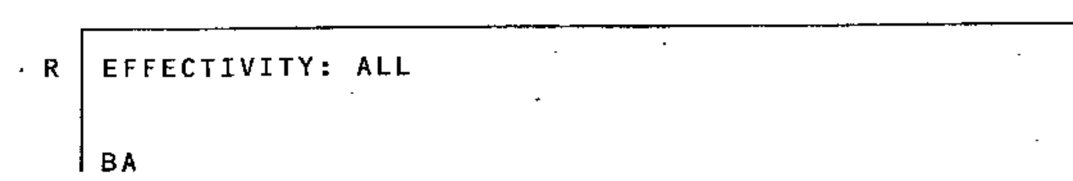
E

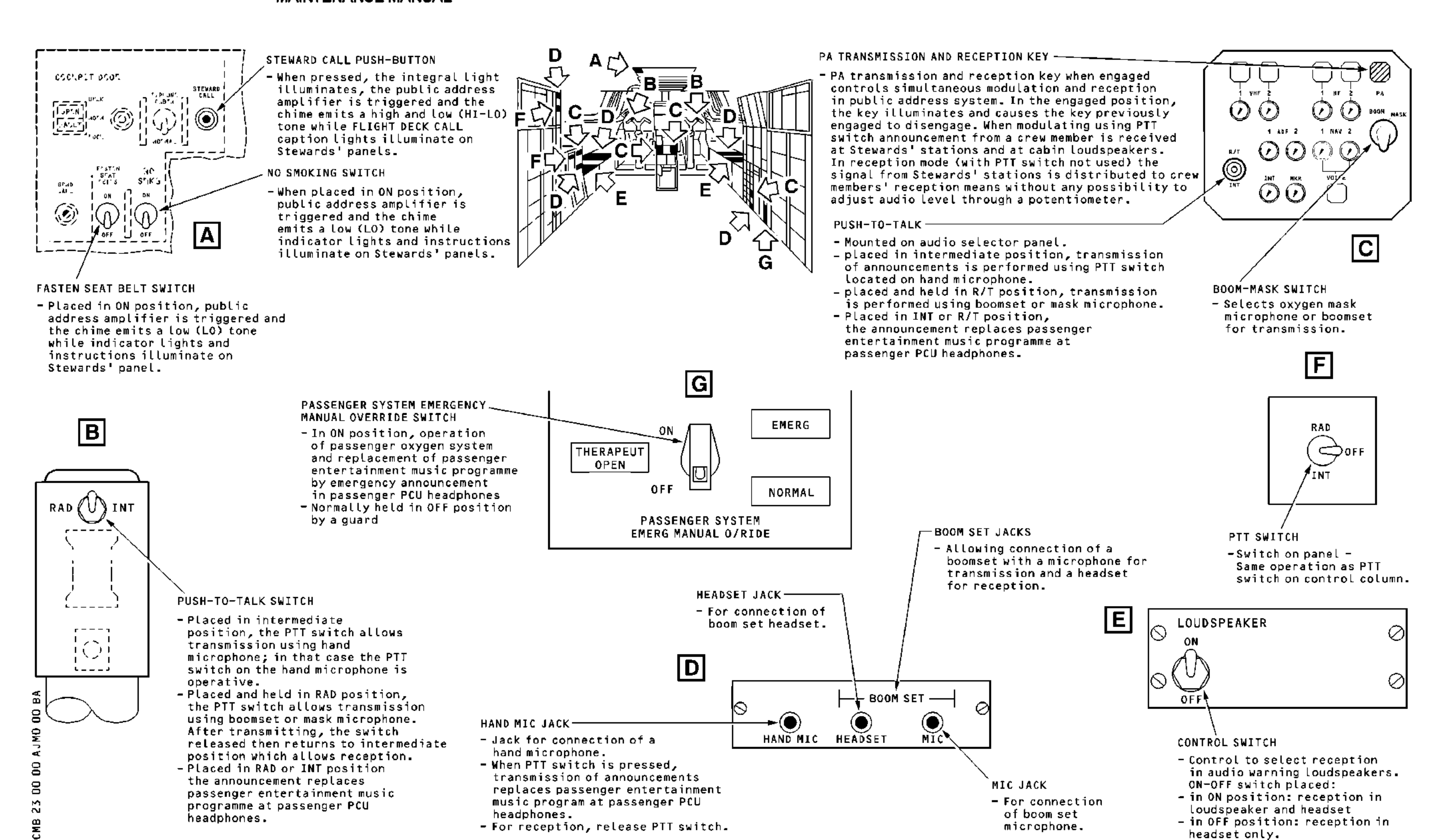


HAND MIC jack for connection of a hand microphone.
When the PTT switch on the hand microphone is pressed for a transmission in HF or VHF band, aural and visual warnings are cancelled

CMA 23 00 00 0 BGMO

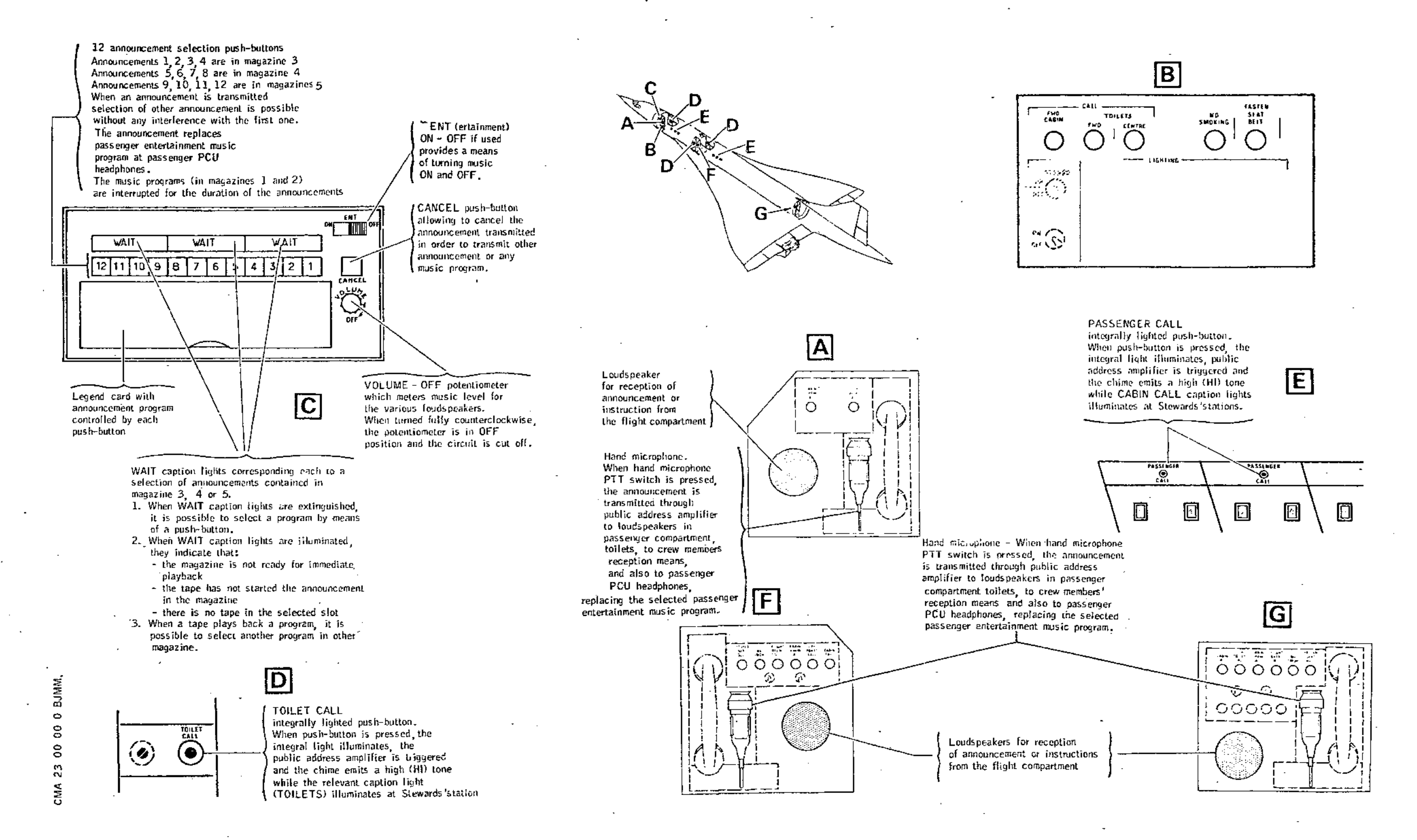
SELCAL - System Management
Figure 004



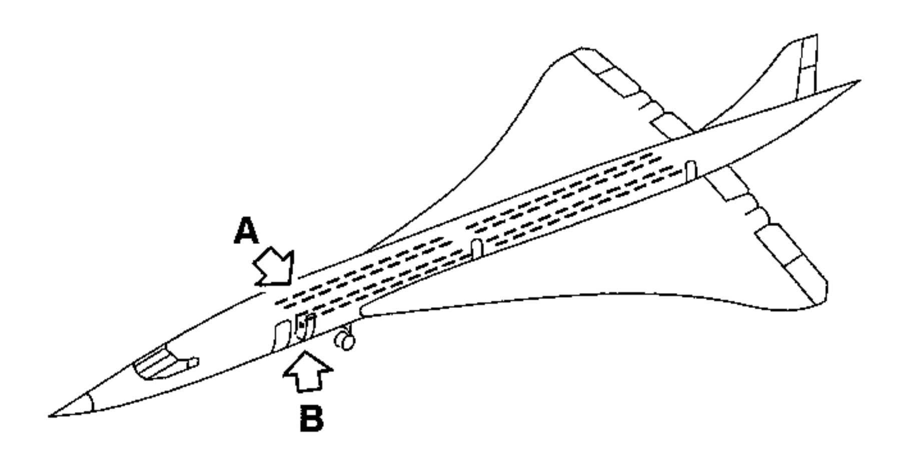


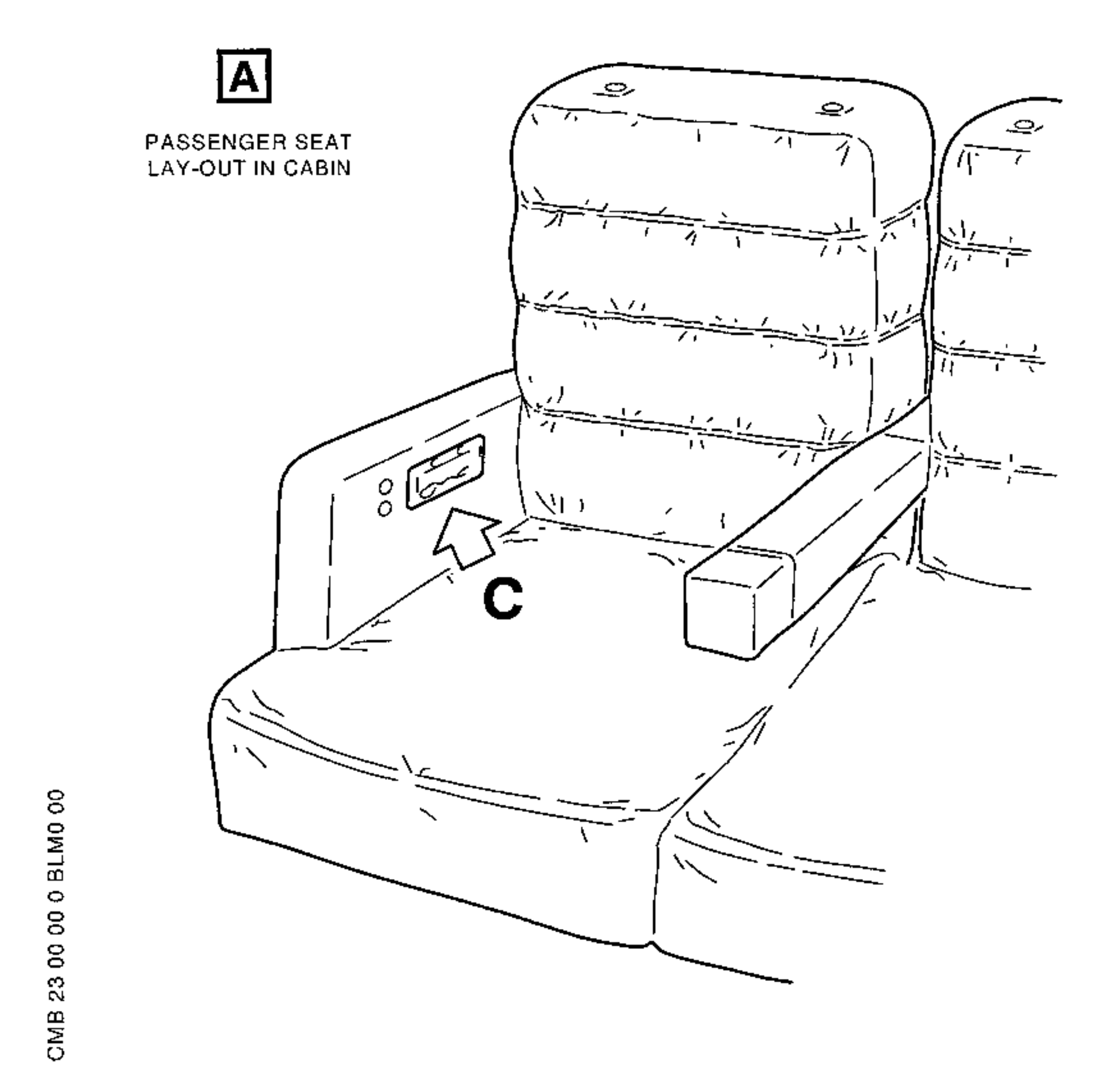
Public Address - System Management (Sheet 1/2)
Figure 005

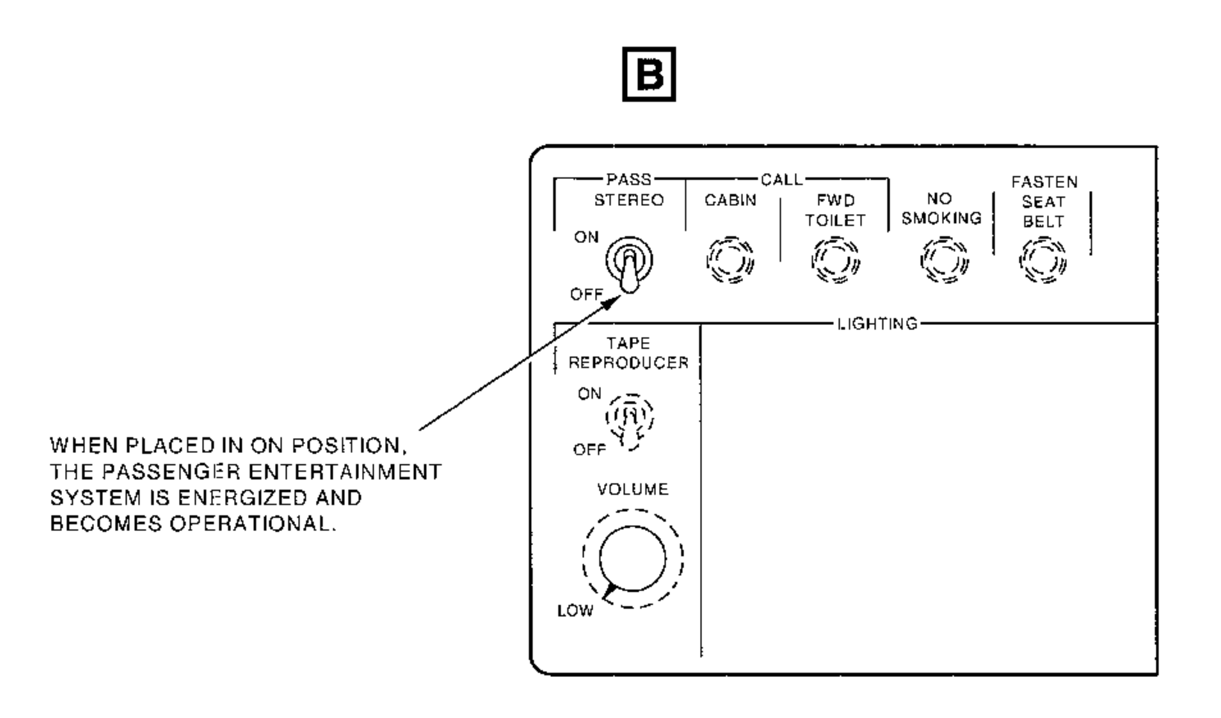
R

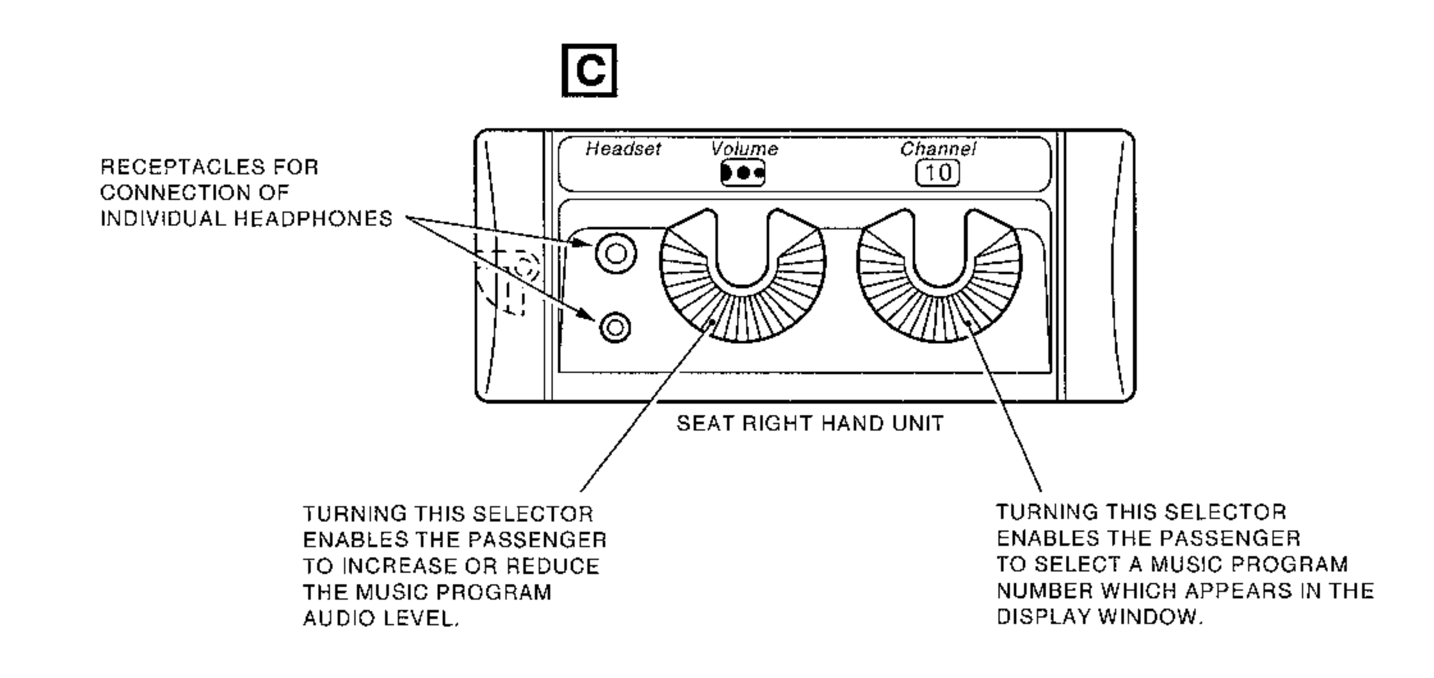


Public Address - System Management (Sheet 2/2)
Figure 005







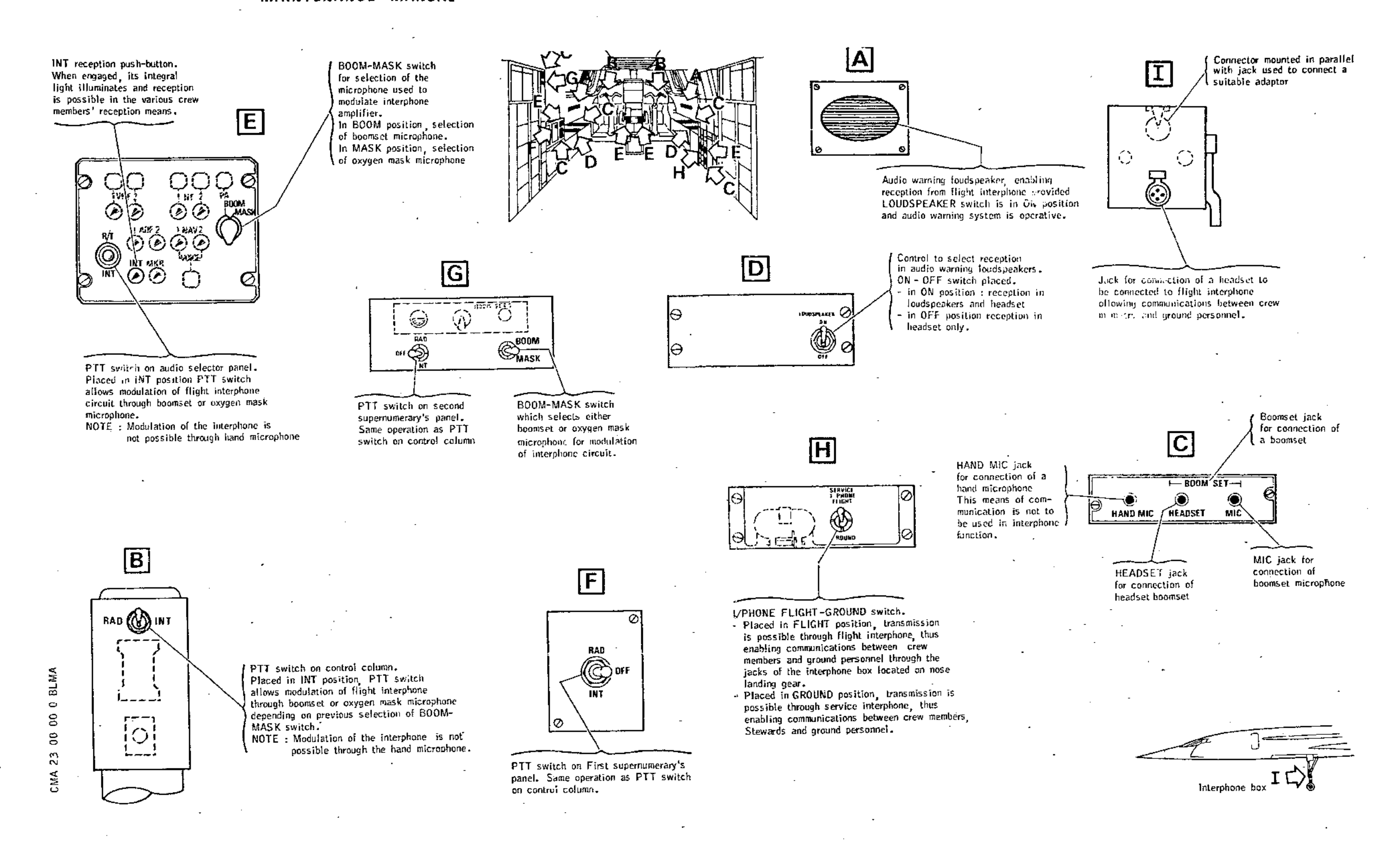


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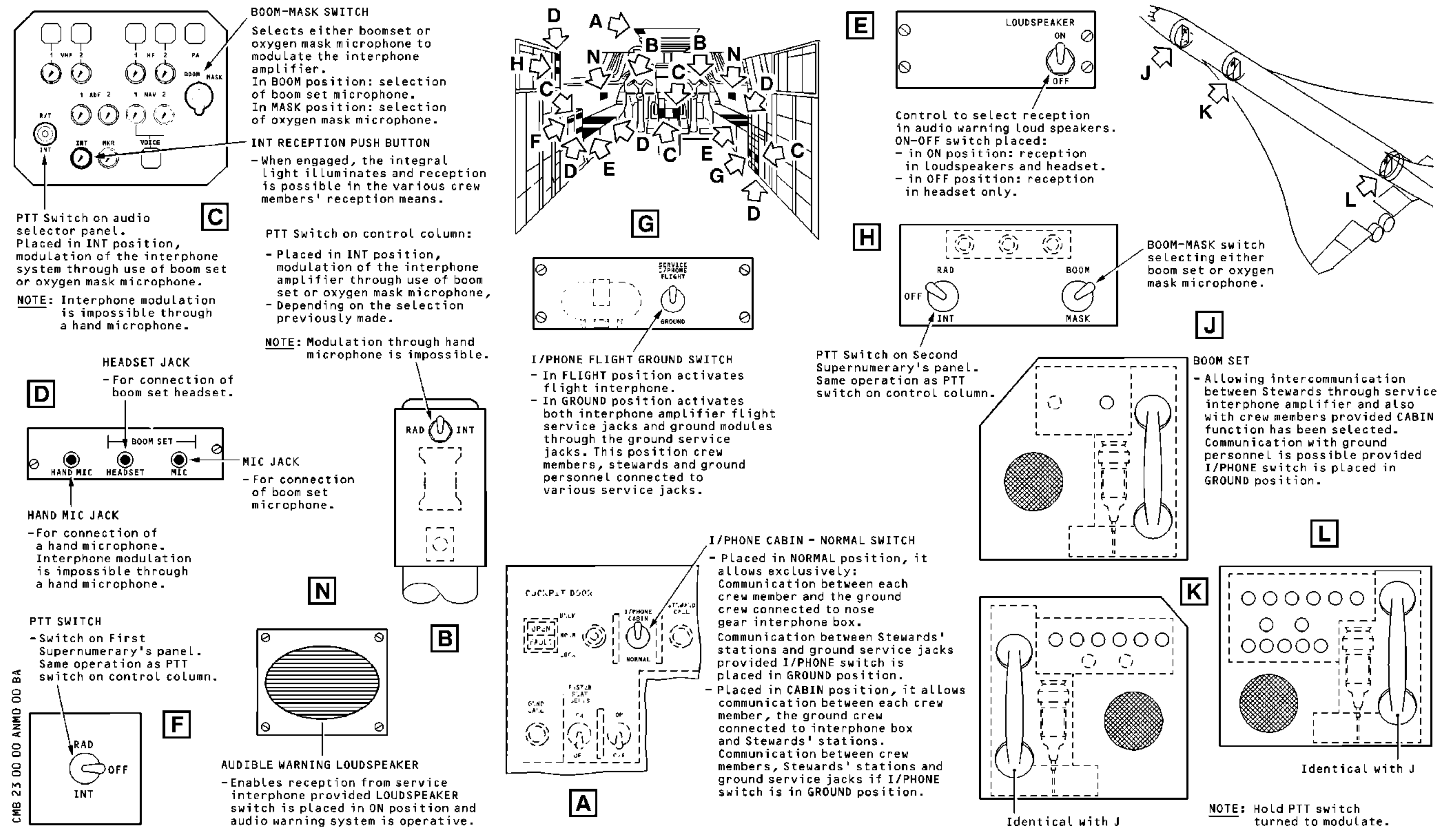
CMB 23 00 00 0 BLM0 00

R

Passenger Entertainment - System Management
Figure 006



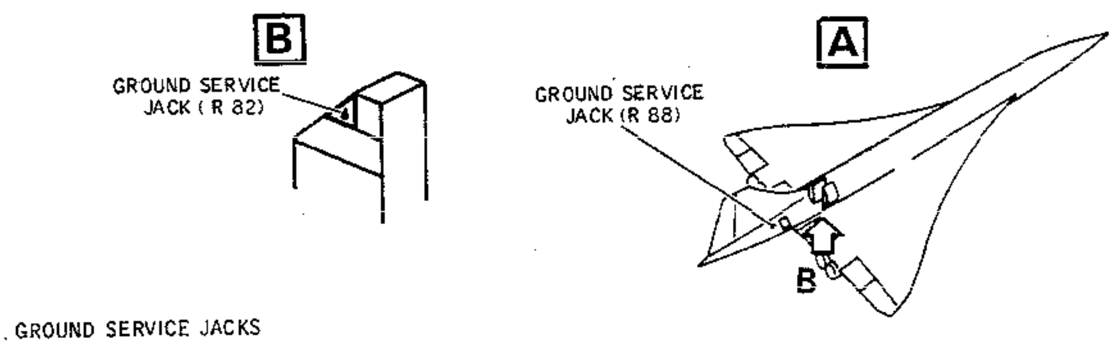
Flight Interphone - System Management (Sheet 1/3)
Figure 007



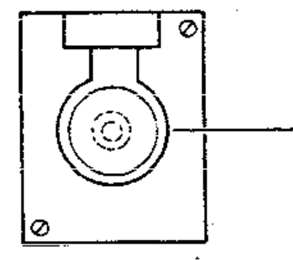
Service Interphone - System Management (Sheet 2/3)
Figure 007

R

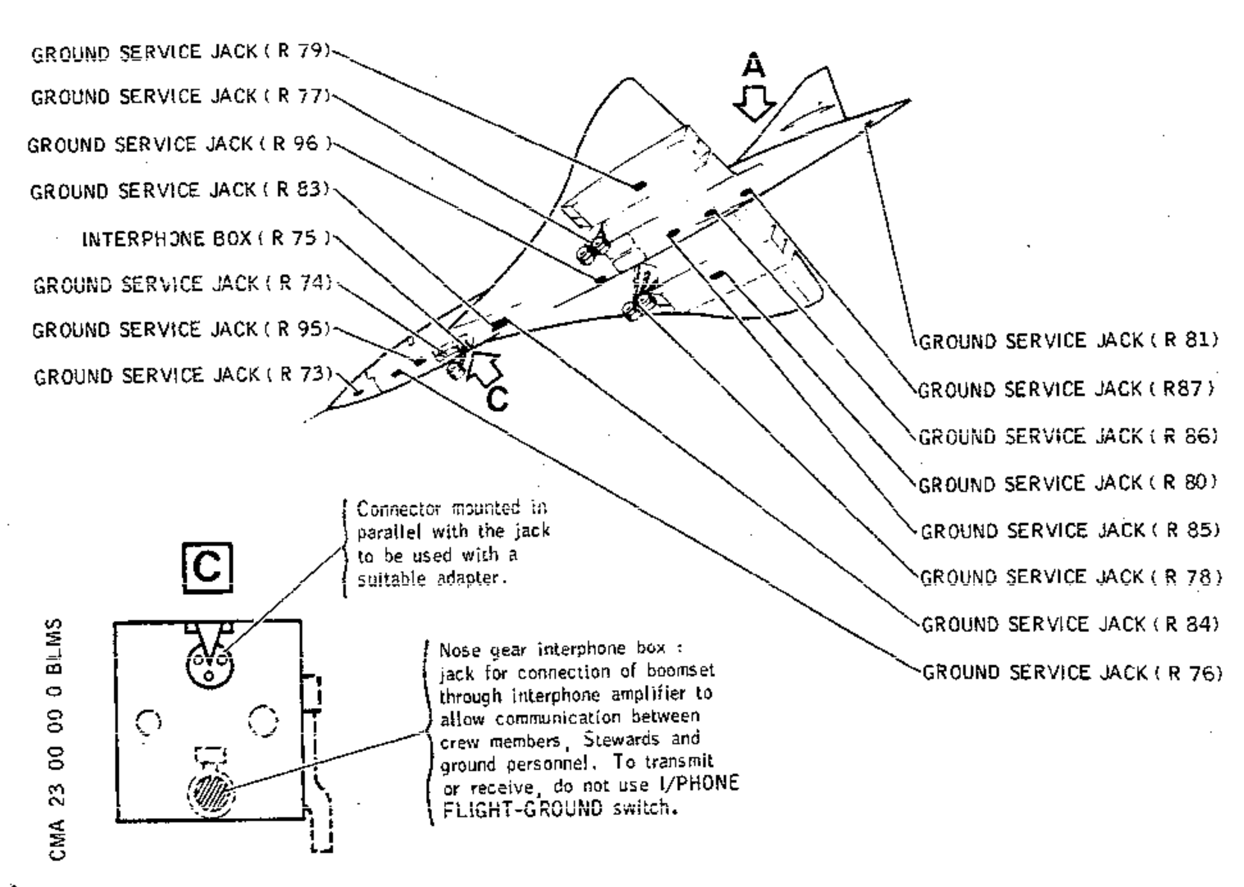
CMB 23 00 00 ANMO 00 BA



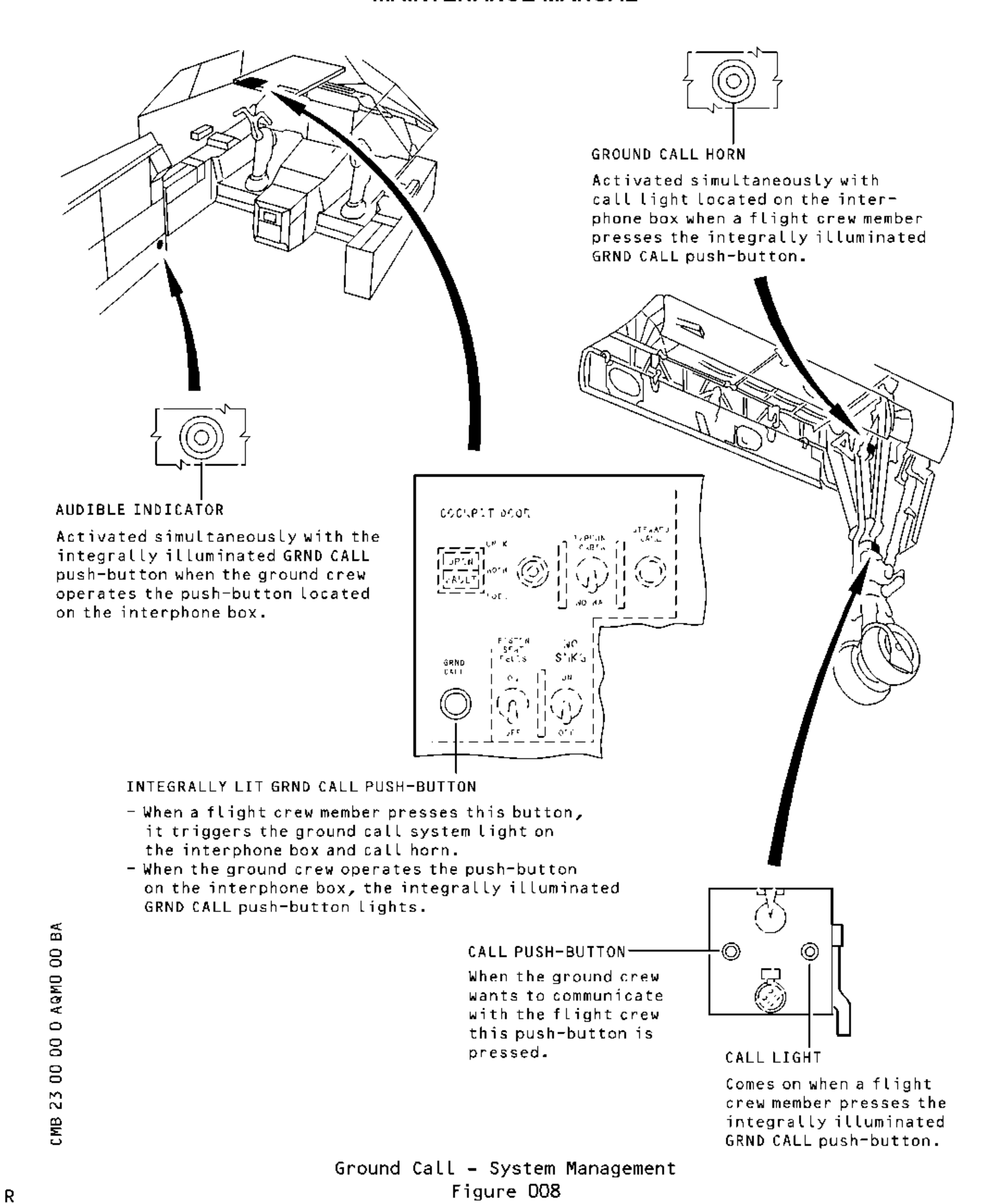
GROUND SERVICE JACKS



All ground service jacks are available for communication between ground personnel, crew members and Stewards when I/PHONE FLIGHT-GROUND switch on flight engineer's panel is in GROUND position. The jack on interphone box operates independently from the position of this switch.



Ground Service Interphone - System Management (Sheet 3/3)
Figure 007

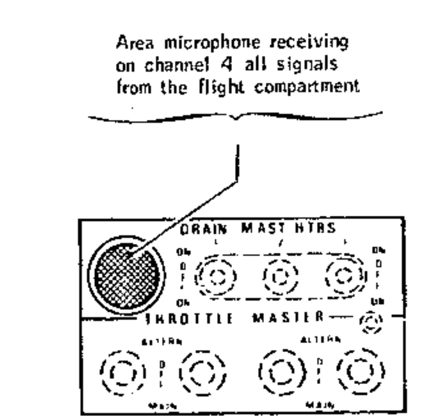


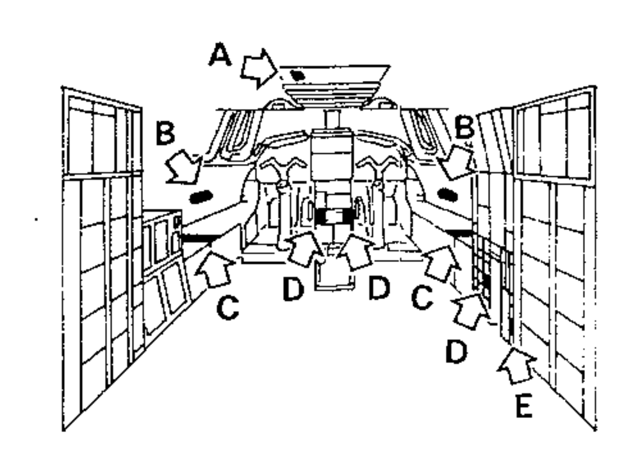
Ground Call - System Management
Figure 008

R

A

Area microphone receiving on channel 4 all signals from the flight compartment





PTT switch enabling to record on track 1 of magnetic tape depending on microphone used

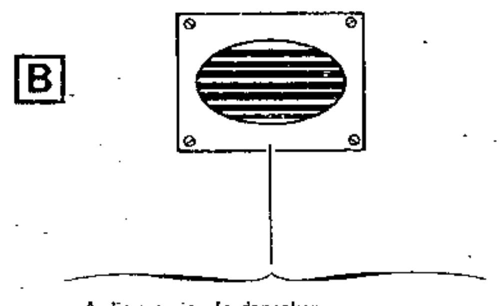
D

VHF
HF
PA
BOOM
MASK
R/T
INT
ADF
NAV
VOICE
INT MKR

Audio selector panel
- Depending on selection of communication or/and navigation reception on Captain's and 1st officer's audio selector panels, the selected trafic will be recorded on channel 3 or 4.

- Microphone signals will be recorded on track 1 provided one transmission key is engaged on Captain's, 1st officer's or Flight Engineer's audio selector panel.

B



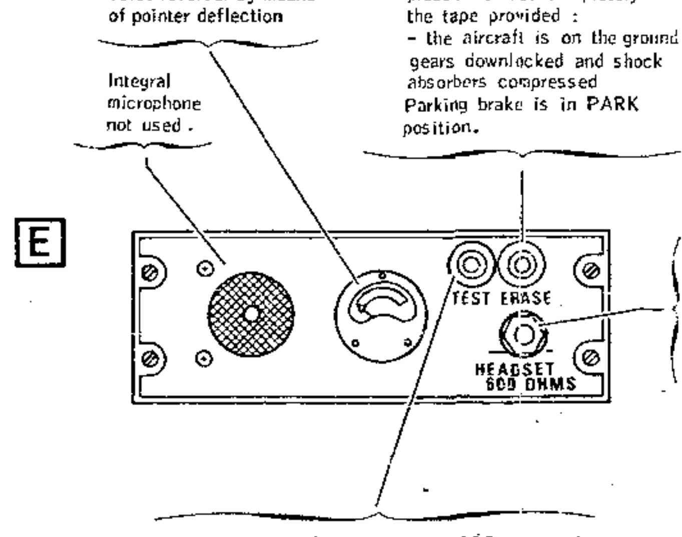
Audio warning loudspeaker allowing reception from navigation and communication channels selected by the audio selector panel provided LOUDSPEAKER switch is placed in ON position and audio warning system is operative.
The warnings routed through the audio warning system can be transmitted on area microphone channel.

E

Test galvanometer which allows to check Correct operation of voice recorder by means of pointer deflection

Integral microphone not used.

ERASE push-button when pressed erases completely the tape provided :
- the aircraft is on the ground gears downlocked and shock absorbers compressed
Parking brake is in PARK position.



Jack for connection of a headset to check the 600Hz test signal, the erase signal and also to check reception

TEST push-button pressed : a 400Hz signal is applied to cockpit voice recorder.
- on galvanometer, the pointer deflects and reads "8" at least for 0.8 second. (pointer deflects for each track)
- a 600Hz signal is heard in headset for 5 seconds (audio signal of 0.8 second duration for each track)

C

LOUDSPEAKER
ON
OFF

Control to select reception in audio warning loudspeakers
ON - OFF switch placed :
- in ON position : reception in loudspeaker and headset
- in OFF position : reception in headset only.

CMA 23 00 00 0 BQM0

Voice Recorder - System Management
Figure 009

5. Electrical Supply (Ref. Fig. 010)

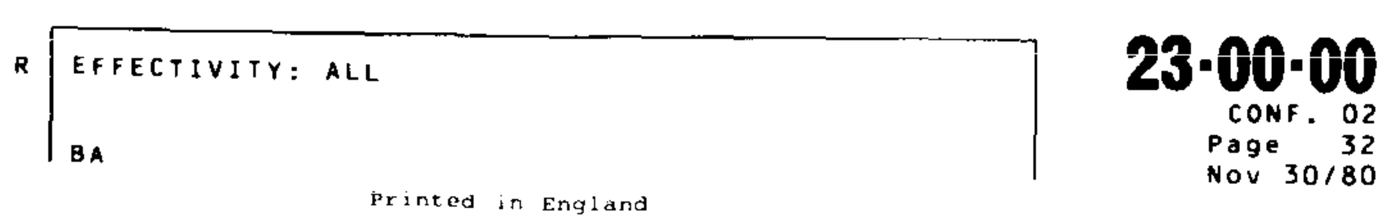
The various communication systems are fed with electrical power from busbars.
The 28VDC power is supplied from normal and essential busbars.
The 115VAC power is supplied from normal and essential busbars.
The interphone system is directly supplied with 28VDC power by circuit breaker 1F102 through the ground power protection unit X20 (GPPU) itself supplied by ground connector X17.

CIRCUIT BREAKERS	SERVICE	BUSBARS	PANELS
1R 3	HF1 DC SUP	"A" Essential 28VDC Busbar 3P	1-213
1R 4	HF1 AC SUP	Essential 115VAC Busbar 5X	2-213
2R 3	HF2 DC SUP	Main 28VDC Busbar 2P	15-216
2R 4	HF2 AC SUP	Main 115VAC Busbar 3X	13-216
1R 17	VHF1 SUP	"A" Essential 28VDC Busbar 3P	1-213
2R 17	VHF2 SUP	Main 28VDC Busbar 2P	15-216
R 117	SELCAL No.1 SUP	Main 28VDC Busbar 1P	15-215
R 118	SELCAL No.2 SUP	Main 28VDC Busbar 2P	15-216
R 139	PA SUP	"A" Essential 28VDC Busbar 3P	1-213
R 247	TAPE REPRO AC SUP	Essential 115VAC Busbar 6X	2-213
R 248	TAPE REPRO DC SUP	"A" Essential 28VDC Busbar 3P	1-213
R 102	INPH SUP	Ground Power Busbar X17	25-216
R 89	No.1 INPH SUP	"A" Essential 28VDC Busbar 3P	1-213
R 90	No.2 INPH SUP	"B" Essential 28VDC Busbar 4P	3-213
R 188	VOICE REC SUP	Essential 115VAC Busbar 6X	2-213
H1216	GROUND CALL HORN	Battery Busbar 5P	16-215
R 332	PASS ENT DC SUP	"A" Main 28VDC Busbar 1P	15-216
R 333	PASS ENT AC SUP	Main 115VAC Busbar 1X	14-215

BATTERY BUSBAR 5P
H1216
GROUND CALL
DC AND AC BUSBAR SUPPLY
(1P - 2P - 3P - 4P - 3X - 5X - 6X ---)
X17 GROUND POWER CONNECTOR
115 VAC
GPPU
28VDC
R102
TRIP
CLOSE
R104
R103
INTERPHONE AMPLIFIER
R89
R90
CAPTAIN'S AUDIO SELECTOR PANEL
1st OFFICER'S AUDIO SELECTOR PANEL
"B" ESSENTIAL 28VDC BUSBAR 4P
FLIGHT ENGINEER'S AUDIO SELECTOR PANEL
1ST SUPERNUMERARY'S AUDIO SELECTOR PANEL
"A" ESSENTIAL 28VDC BUSBAR 3P
R139
PUBLIC ADDRESS AMPLIFIER
CHANNEL 1
SELCAL
CHANNEL 2
R117
R332
MAIN 28VDC BUSBAR 1P
R118
1R17
T/R VHF 1
1R3
T/R HF 1
T/R VHF 2
2R17
MAIN 28VDC BUSBAR 2P
R248
PUBLIC ADDRESS TAPE REPRODUCER
T/R HF 2
2R3
ESSENTIAL 115VAC BUSBAR 6X
R247
R188
COCKPIT VOICE RECORDER
2R4
MAIN 115VAC BUSBAR 3X
ESSENTIAL 115VAC BUSBAR 5X
1R4
PASSENGER ENTERTAINMENT AMPLIFIER
R333
MAIN 115VAC BUSBAR 1X

CMA 23 00 00 0 BSMO

Communication System Electrical Supply
Figure 010



1. Safety Precautions

WARNING : BEFORE PROCEEDING WITH MAINTENANCE WORK ON OR NEAR MECHANICAL FLIGHT CONTROLS OR PRIMARY FLIGHT CONTROL SURFACES, LANDING GEARS, ASSOCIATED DOORS OR ANY MOVING COMPONENT, MAKE CERTAIN THAT GROUND SAFETIES AND/OR WARNING NOTICES ARE IN CORRECT POSITION TO PREVENT INADVERTENT OPERATION OF CONTROLS.

BEFORE POWER IS SUPPLIED TO THE AIRCRAFT MAKE CERTAIN THAT ELECTRICAL CIRCUITS UPON WHICH WORK IS IN PROGRESS ARE ISOLATED.

WHEN EQUIPMENT IN RACKS AND/OR FLIGHT COMPARTMENT INSTRUMENTS ARE SUPPLIED WITH POWER FROM THE GROUND POWER UNIT, THE ELECTRONICS RACK VENTILATION SYSTEM AND APPROPRIATE VENTILATION SYSTEMS MUST BE IN OPERATION. THE GROUND DEPRESSURIZATION VALVE MUST BE OPEN. IF AMBIENT TEMPERATURE IS ABOVE 30°C IN THE FLIGHT COMPARTMENT, THE GROUND AIR PRECONDITIONING SYSTEM MUST BE IN OPERATION.

TRANSMITTING IN HF MODE IS PROHIBITED DURING FUEL TANK REPLENISHING.

2. Technical Precautions

A. HF Tuner Unit

On selector unit, check pressure within the tuner unit by pressing SA AIR push button and reading the indication displayed on the galvanometer. (Two pressure switches installed inside the tuner unit and related to the galvanometer enable correct pressure, low pressure or complete loss of pressure indications to be displayed).
In case of pressure drop within the tuner unit, indicated in flight by the pressure switches, it is noted that the fault disappears on the ground. This is due to atmospheric pressure exceeding then 8.5 psi (pressure switch calibration pressure).
As in general the atmospheric pressure exceeds the pressure switch tiggering threshold (approximately 14 psi), the tuner unit pressurization defect cannot be evidenced during a check on the ground.
Consequently, in topics (23-11-xx) dealing with description or utilization of SA-AIR push-button on the selector unit, it must be noted that :

(1) The test is applicable in flight.

(2) As the atmospheric pressure on the ground exceeds the pressure switch triggering threshold (approximately 14 psi), testing only enables detection of a slight leakage during a short period after landing.
In the majority of cases, tuner unit pressurization defects cannot be evidenced on the ground.

(3) If a fault has been noted in flight but cannot be detected on the ground, the tuner unit is probably subject to leakage.
Remove tuner unit to make certain that it is hermetically sealed.

R After SB 23-024 FOR A/C 001-007,

R A. HF Tuner Unit

R On selector unit, check pressure within the tuner unit by
R pressing AIR push-button and reading the indication dis-
R played on the galvanometer.
R Two pressure switches installed inside the tuner unit are
R respectively set to 14 psi (0.98 kg/cm^2) and 8.5 psi
R (0.59 kg/cm^2) and enable three pressure indications to
R be displayed :

R - upper green range : correct pressure (pressure higher
R than 14 psi)
R - center green range : low pressure which does not prevent
R tuner unit operation.
R (pressure between 14 and 8.5 psi).
R - red range : total loss of pressure (pressure lower than
R 8.5 psi)

R This check is always applicable in flight whereas it cannot
R be carried out on the ground as the atmospheric pressure
R exceeds the two pressure switch triggering thresholds.
R In the case of a great loss of pressure (red range on the
R galvanometer) in flight FAULT PRESS magnetic indicator
R located on selector unit front face is excited and displays
R a yellow or white indication.
R After landing and in spite of the atmospheric pressure, the
R magnetic indicator remains excited and shows that a great
R loss of pressure inside the tuner unit has occured in
R flight.

GENERAL - REMOVAL/INSTALLATION

1. General

The following text provides general removal/installation procedures for control units or rack-mounted equipment installed in electronics rack shelves and amenity stowages located in the various aircraft compartments. Equipment and components are thus readily replaceable.

NOTE 1 : Equipment, connectors, cables and wires must be checked for evidence of damage.
Equipment and rack connectors must be checked for :
- correct condition of pins (no trace of oxidation)
- correct external condition of connectors.

NOTE 2 : Control units are visually checked for correct external condition.

NOTE 3 : For air-cooled equipment installed on panels, shelves or racks, it is necessary to blank off ventilation outlets when removing the equipment unless replacement is performed immediately.
Nonobservance of this precaution can result in ventilation failure leading to damage to other equipment on panel or shelf.

2. Rack-Mounted Equipment

NOTE : As all rack-mounted equipment dealt with in this chapter is identically installed, only one removal/installation described.

A. Reasons for the Job

(1) Removal for replacement of a faulty component.

(2) Removal for maintenance operation on the component, on the associated circuitry or to gain access to another item of equipment.

B. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	

DESCRIPTION	PART NO.
R Blanking Plates for Ventilation Outlets	
R HF Transceivers	23-11-33, R/I
R HF Selectors Unit	23-11-46, R/I
R VHF Transceivers	23-21-33, R/I
R Selcal Decoder	23-22-33, R/I
R Public Address Amplifier	23-31-33, R/I
R Public Address Tape Reproducer	23-31-34, R/I
R Passenger Entertainment Amplifier	23-32-31, R/I
R Passenger Entertainment Tape Reproducer	23-32-32, R/I
R Interphone Amplifier	23-41-33, R/I
R Cockpit Voice Recorder	23-71-52, R/I

R NOTE : Refer to 23-XX-XX, Removal/Installation for :
R - location of component (1) to be removed
R - prepare and preparation of replacement component
R procedures
R - removal/installation procedure
R - functional test procedure.

C. Prepare

R (1) Refer to 23-XX-XX, Removal/Installation.

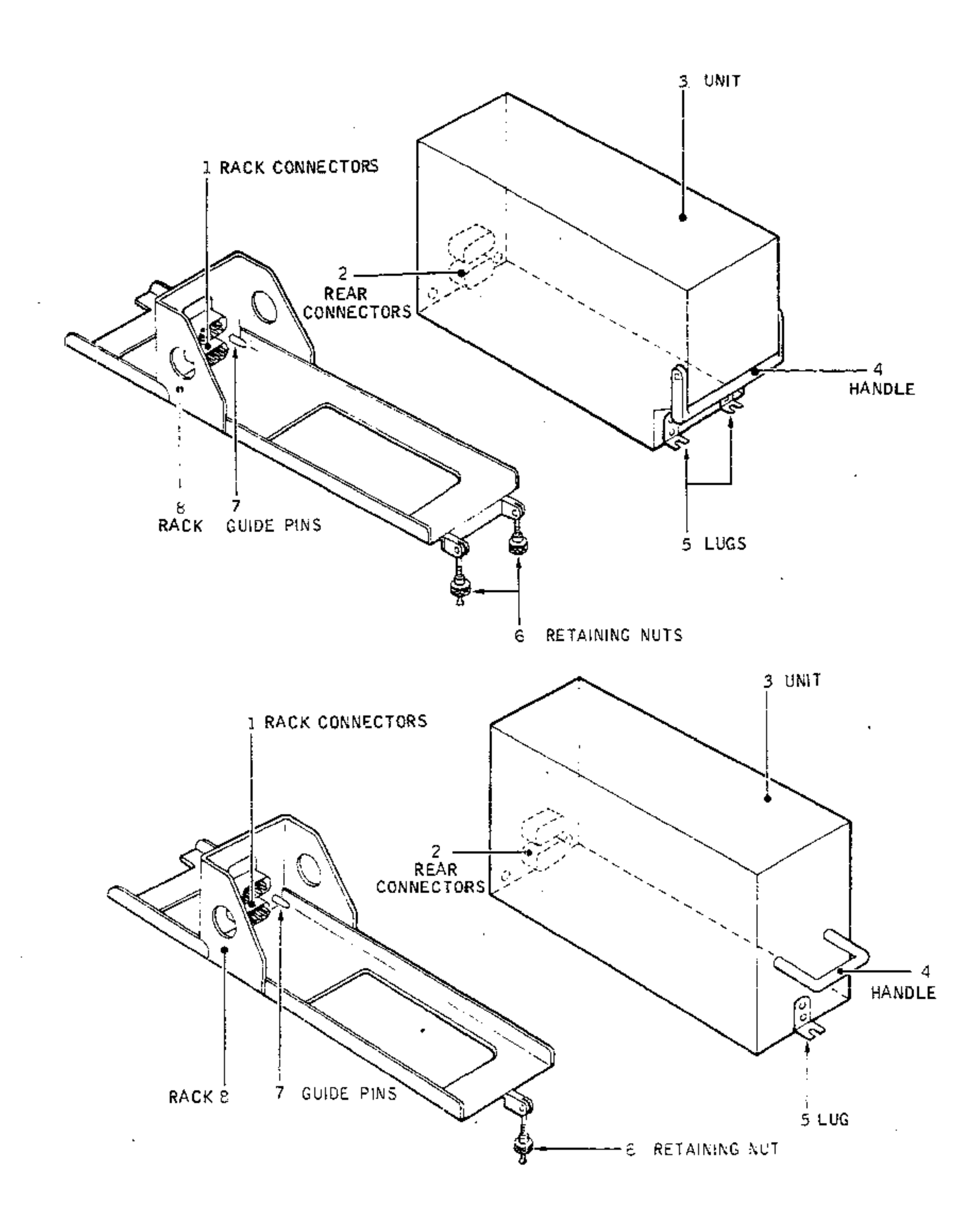
D. Remove (Ref. Fig. 401)

R NOTE : Grip handles are not all identical on all components
R but their use is similar.

R (1) When applicable, disconnect connectors located on
R equipment front face.

R (2) Unscrew retaining nut(s) (6) until lug(s) (5) is (are)
R free.

R (3) Swing downwards retaining nut shafts.



Rack-Mounted Component - Removal/Installation
Figure 401

R

R (4) Slowly pull handle (4), to disconnect rear connectors
R (2) on unit (3) from rack (8) connectors (1), continue
to pull until equipment is fully disengaged from rack
R slides.

R (5) Cap connectors (1) and (2).

R (6) Install blanking plate(s) on ventilation outlet(s) left
R open on shelf (Ref. <u>NOTE 3</u>, Para. 1).

E. Preparation of Replacement Component

R (1) Make certain that rack is clean and connectors in cor-
R rect condition (Ref. Para. 1. <u>NOTE 1</u>).

R (2) Visually check that :
R - replacement component is in correct condition
R - connector(s) are undamaged and show no trace of
R oxidation.

F. Install
R (Ref. Fig. 401)

(1) Remove caps from connectors (1) and (2) and blanking
R plate(s) from ventilation outlet(s) on shelf where
R applicable.

R (2) Position unit (3) on rack (8) and slowly slide rear-
R wards, making certain that rack guide pins (7) properly
R engage into holes on component.

R (3) Continue to push unit, taking care to slowly engage
R connectors (1 and 2).
R When unit is at stop, unit and rack front panels must
R be flush.

R (4) Lift retaining nut (6) shafts engaging nut(s) (6) on
R lug(s) (5) and tighten nuts until locked.

R (5) Connect connectors located on equipment front face,
R when applicable.

R G. Test

R (1) Refer to 23-XX-XX, Removal/Installation.

H. Close-Up

(1) Make certain that working area is clean and clear of
tools and miscellaneous items of equipment.

R 3. Controls Units

R NOTE : As all control units (control box, jack panels, audio
R selector panels) dealt with in this chapter, are identi-
R cally installed, only one Removal/Installation is descri-
R bed.

R A. Reasons for the Job

R (1) Removal for replacement of a faulty control unit.

R (2) Removal for maintenance operation on the control unit
R on the associated circuitry or to gain access to ano-
R ther item of equipment.

B. Equipment and Materials

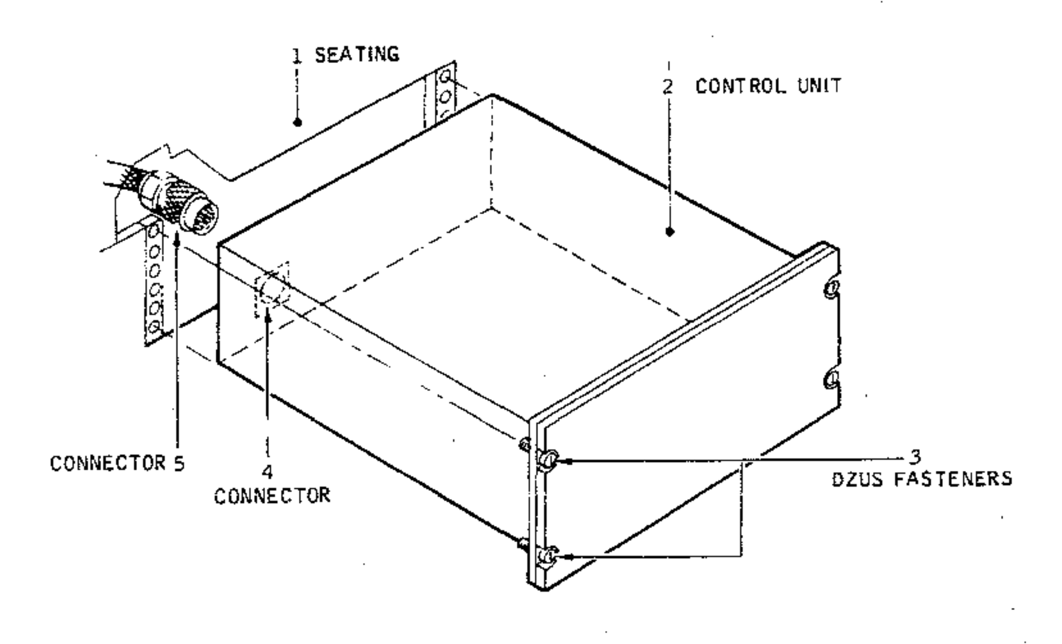
	DESCRIPTION	PART NO.
	Circuit Breaker Safety Clips	
R	Blanking Plugs/Caps for Connectors	
R R	Blanking Plates for Ventilation Outlets (if required)	
R	HF Control Unit	23-11-13, R/I
R	VHF Control Units	23-21-13, R/I
R	Selcal Control Unit	23-22-13, R/I
R	Tape Reproducer Control Unit	23-31-34, R/I
R	Audio Selector Panel	23-41-21, R/I
R	Jack Panel	23-41-41, R/I
R	Cockpit Voice Recorder Control Unit	23-71-13, R/I

R NOTE : Refer to 23-XX-XX, Removal/Installation for :
R - location of component(s) to be removed
R - prepare and preparation of replacement component
R procedures
R - removal/installation procedure
R - functional test procedure

C. Prepare

R (1) Refer to topic(s) concerned.

D. Remove (Ref. Fig. 402)



Control Unit - Removal/Installation
R Figure 402

(1) Unlock the four dzus fasteners (3).

R (2) Pull control unit (2).

R (3) Disconnect electrical connector(s) (5) from control
R unit connector(s) (4).

R (4) Remove control unit (2) and cap connectors (4) and (5).

R (5) If necessary, install blanking plate(s) on ventilation
R outlets left open on panels (centre console, Flight
R Engineer's panel, etc...)(Ref. Para. 1. NOTE 3).

E. Preparation of Replacement Component

R (1) Make certain that control unit seating is clean and
that connector(s) are in correct condition (Ref.

R Para. 1. NOTE 1).

R (2) Visually check that :
R - replacement component is in correct condition
R - connector(s) are undamaged and show no trace of
R oxidation.

F. Install
R (Ref. Fig. 402)

R (1) Remove caps from connectors (5) and (4) and where ap-
R plicable, blanking plate(s) from ventilation outlet(s)
R on panels.

R (2) Position control unit (2) in front of its seating (1).

R (3) Connect connector (5) to connector (4) on control unit.

R (4) Position control unit (2) in seating (1), to align the
R dzus fasteners with the relevant holes.

R (5) Lock the four dzus fasteners (3).

R G. Test

R (1) Refer to 23-XX-XX, Removal/Installation.

H. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

HIGH FREQUENCY - DESCRIPTION AND OPERATION

1. General

The high frequency system comprises two identical installations which can be operated separately by means of a dual control unit.
This equipment provides voice communication in the 2 Mhz to 30 Mhz frequency range.
It is of the SSB (Single Side Band) type.

A. The SSB Principle

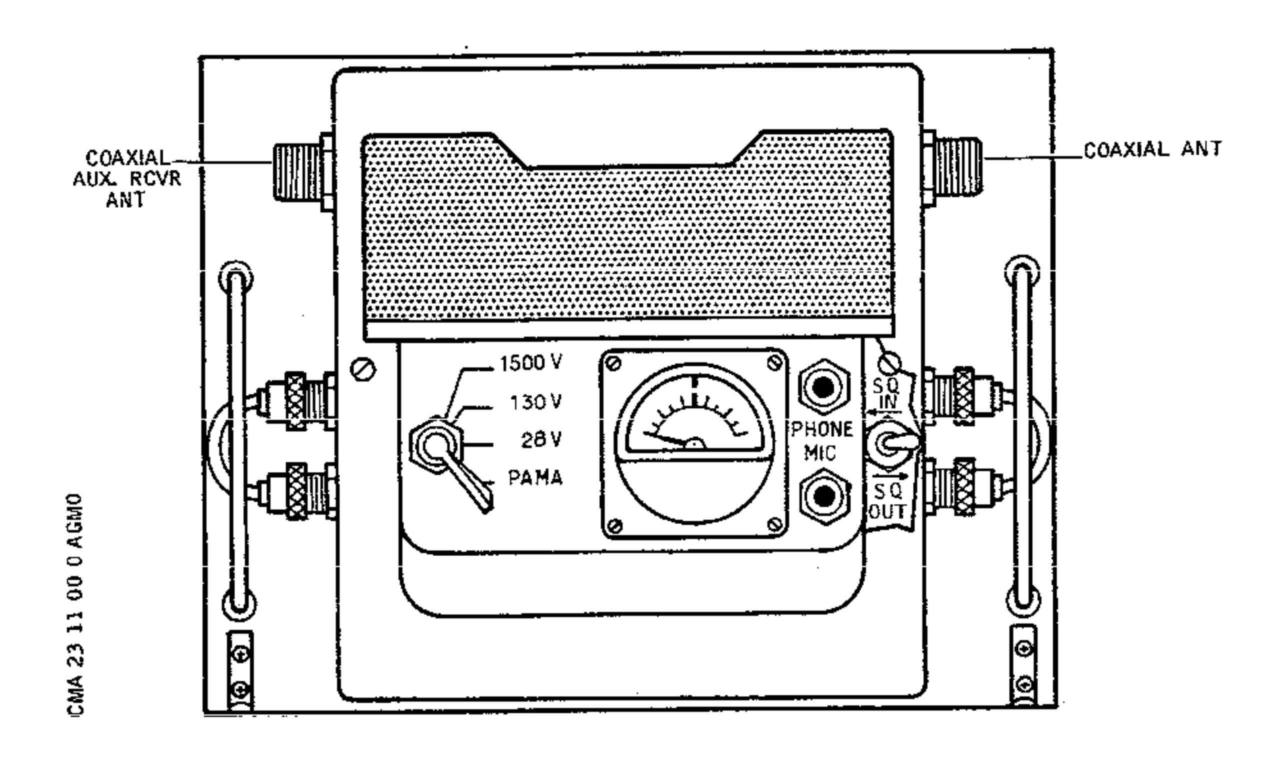
An SSB receiver (an HF receiver so designed to receive SSB transmissions, i.e. transmissions where only the upper band or the lower band of the modulation is transmitted) is identical with a superheterodyne receiver, except for demodulation.
The part of the HF signal which has been suppressed at transmission must be restored to the signal at reception ; this is accomplished by means of a highly stable built-in oscillator. A conventional AM (Amplitude Modulation) signal demodulation could be used for the demodulation of SSB signals, but it would cause such distortions that it is preferable to use a proper SSB demodulator circuit. This circuit is a mixer, tuned to the audio frequency (e.g. : a mixer, fed by 500 KHz and 503 KHz signals, will supply a 3 KHz signal from its output ; with two input signals at the frequencies of 502.7 KHz and 503 KHz respectively, the mixer output signal frequency will be 300 Hz.
SSB communications are little subjected to fading, as only one side band is transmitted, instead of both side bands and the carrier in the case of amplitude modulation.
As phase-amplitude ratio is no longer involved, the signal can only be attenuated, which is an advantage of SSB mode.

R B B. System Components

R B - Transceiver (1R1 and 2R1)
R B - Selector unit (1R8 and 2R8)
R B - Coaxial relays (1R6 and 2R6)
R B - Tuner unit (1R9 and 2R9)
R B - Antenna (1R10 and 2R10)
R B - Dual control unit (R2)

R 2. Transceiver-COLLINS 618T-5
R (Ref. Fig. 001)

R B A. This transceiver is a direct replacement for 618T-2B trans-
R B ceiver (See paragraph 3) and its mechanical characteristics
R B are identical.



Transceiver : Front View
R Figure 001

R B B. The electrical characteristic is also identical except for
R B the following :

R B (1) Channel spacing is now 1kHz.

R B (2) Bandwidth is ± 3kHz not ± 4kHz.

R B C. The operation will be similar except that the control unit
R B 500 kHz selector knobs will be impotent. The transceiver
R B 618T5 will always select the zero digit. There is no opera-
R B tional signifiance in this as all operating frequencies are
R B in whole KH.

3. Transceiver-COLLINS 618T2B
(Ref. Fig. 001)

A. Mechanical Characteristics

The transceiver is fitted in a 1ATR standard case, weighing 22.5 kg (50 lb.).

(1) The front panel carries :

- A PHONE jack, for direct listening to the transceiver signals, by means of a headset.
- A MIC jack, for direct transmission through the transceiver, by means of a microphone.
- A selector switch, with an associated galvanometer, which provides the following possibilities :
  - In the first three positions, a check of internal voltages 1500 V, 130 V and 28 V.
  - In the fourth position (PA - MA), a reading of the power amplifier plate current.

- A cooling fan
- The antenna connectors
- A SQ.IN-SQ.OUT switch when placed in SQ.OUT position inhibits the squelch circuit, thus allowing normal reception. When in SQ.IN position, the squelch circuit is operating, thus clearing up reception (by eliminating certain audio frequency noise).
  This switch can be reached by removing front panel cover
- Two grip handles.

(2) The rear panel carries two connectors, for connection of the transceiver to the various associated items of equipment.

B. Electrical Characteristics

The transceiver is of modular design and widely transistorised.

Number of operation frequencies	280,000
Frequency interspace	0.1 KHz
Operation frequencies	2.0000 MHz to 29.999 MHz, generated by a crystal controlled driver oscillator.
Output power	400 W (Peak Power) in the SSB mode, 125 W in the AM mode.
Tuning time	Independent from the antenna tuning ; does not exceed 8 seconds.
Warm-up time	2 minutes
Input impedance	80 ohms asymmetrical 600 ohms symmetrical
Output impedance	51.5 ohms

The frequency tuning circuits and the output circuit are automatically tuned by means of a servo assembly including a servo-motor and an autopositioner.
The receiver is partly blocked during the tuning time.

C. Operation (Ref. Fig. 002)

(1) Transmit mode

(a) Audio frequency amplifier

Three channels are available :

(a1) An unbalanced 80 ohm channel, for standard microphone, with two amplifier stages.

(a2) A balanced 600 ohm channel, with one amplifier stage, also used for CW operation. From the amplifier output, the signals are fed to the first amplifier stage of the symmetrical channel.

(a3) One channel is used for CW operation.

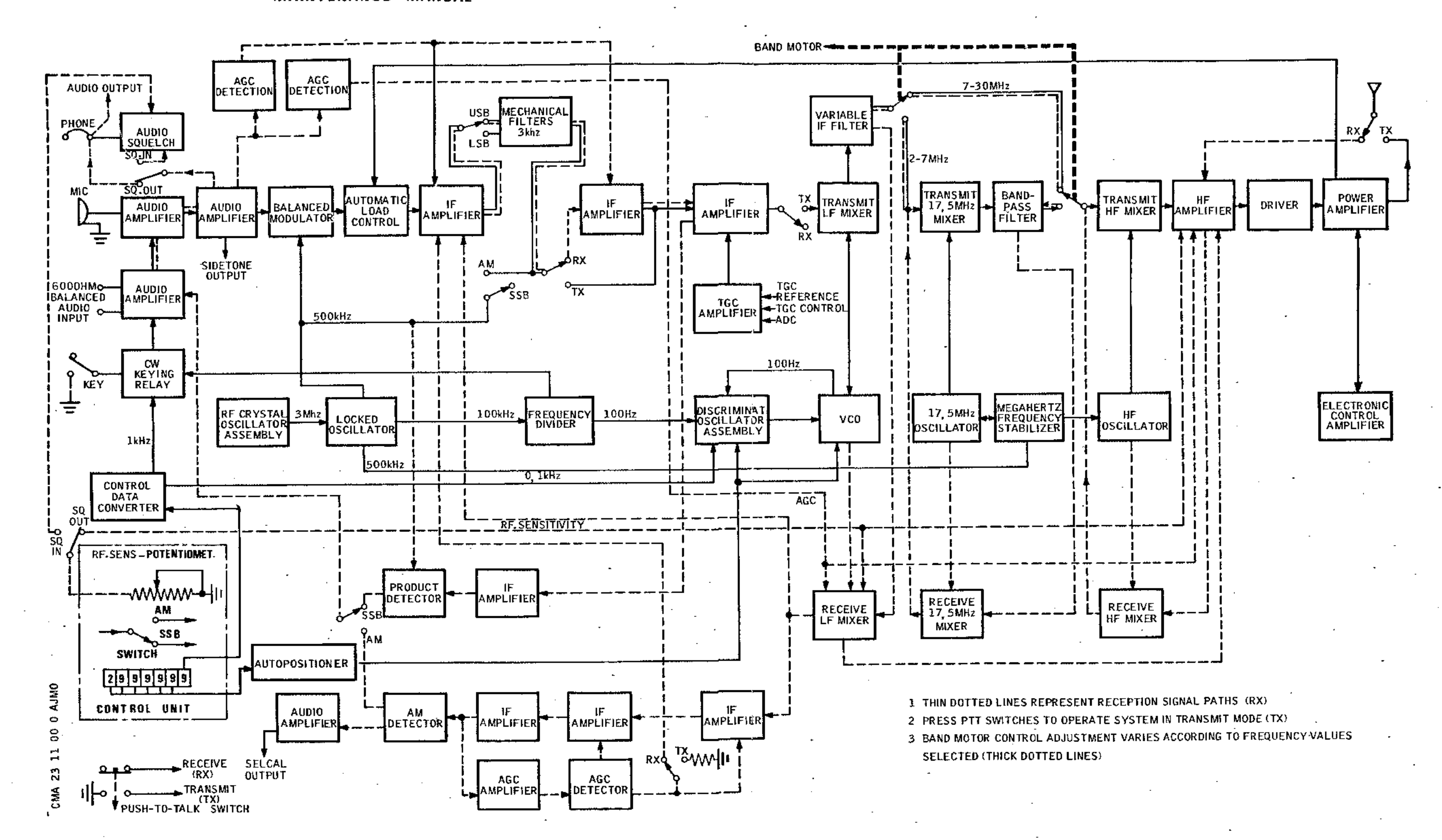
Audio frequency levels are adjusted in the amplifier stages, which allows to equalize the modulation and CW carrier levels. An aural check is available by means of an audio frequency output from the last audio frequency amplifier. The amplifier audio frequency signal is fed to the balanced modulator.

(b) IF generation

The audio frequency signal is fed to the balanced modulator and mixed with the 500 KHz signal from the driver oscillator.
The resulting signal is amplified by means of a feed-back amplifier (ALC) and supplied to an IF amplifier with two output filters :

- One LSB (Lower Side Band) filter, for the 500 KHz - 3 KHz side band.
- One USB (Upper Side Band) filter, for the 500 KHz + 3 KHz side band.

Only one side band is thus transmitted (the upper side band in the present case).
From the filters, the output signal is fed to an IF amplifier, controlled by two circuits :



Transceiver : Block Diagram
Figure 002

- ADC (Automatic Drive Control)
- TGC (Transmitter Gain Control) in the AM operation mode only.

The control by these two circuits provides linear amplification during the course of gain and HF control variations.
When the transceiver is operated in the AM mode (control from the control unit), the carrier is re-introduced in the filter output, so as to restore the conventional AM signal.
From the IF feed-back amplifier output, the signal is fed to the audio frequency mixer of the translator (variable frequency changer).

(c) Master oscillator (Ref. Fig. 003)

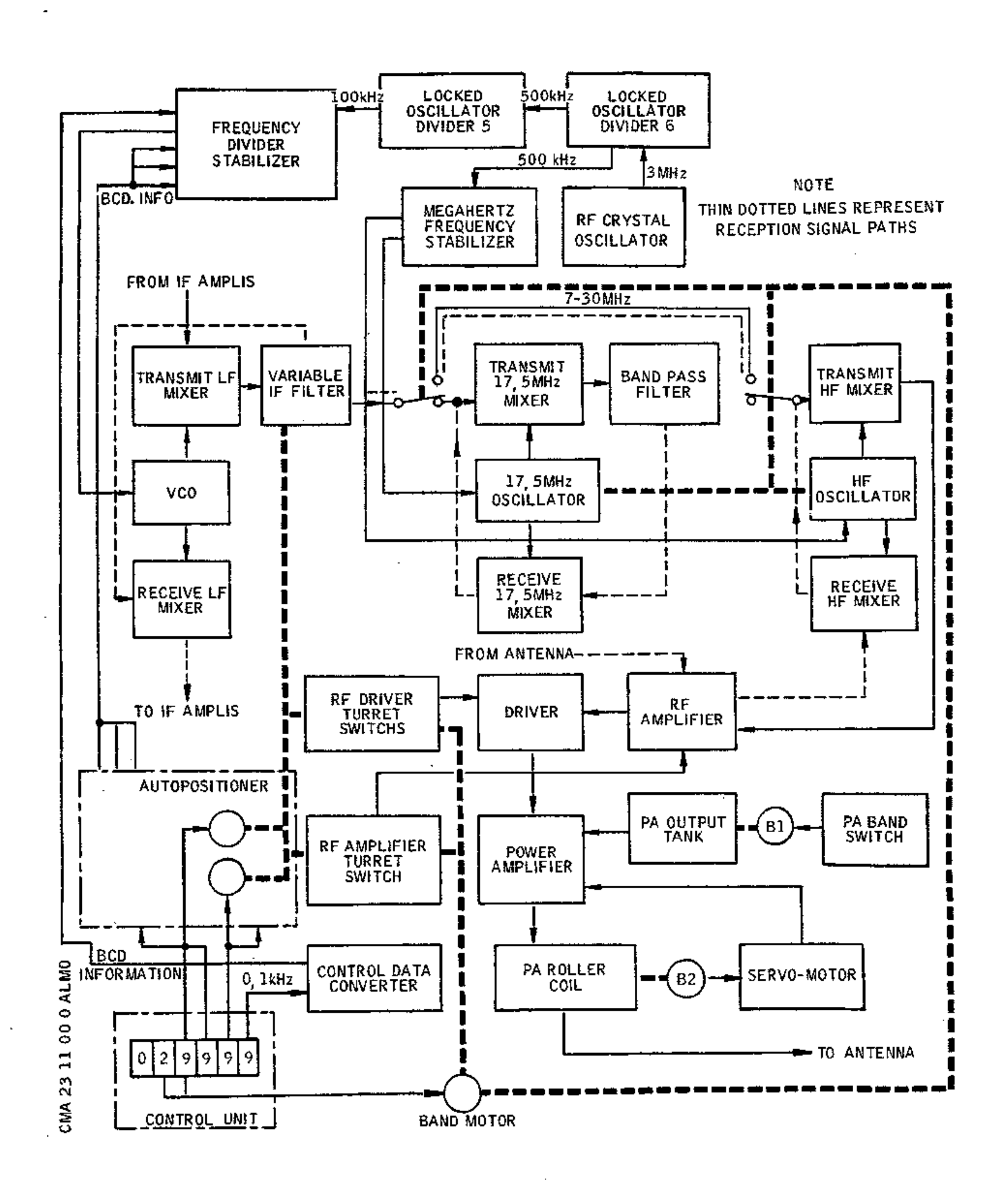
This stage provides the HF frequency generation. It includes a 3 MHz crystal, with frequency drift and temperature compensation.
The oscillator generates a 3 MHz stabilised signal, processed by two frequency dividers in series which provide the basic 500 KHz and 100 KHz signals required for the transceiver.

(d) Control data converter

This module converts the 0.1 KHz signals from the control unit into binary (BCD) information for the frequency divider stabilizer circuit both in the transmit mode and the receive mode. It also includes a 1 KHz oscillator, which supplies a modulation signal used for tuning and for CW transmissions.

(e) Frequency selection and stabilisation

The automatic tuning loop provides a remote control, from the control unit, for frequency selection, frequency positioning and frequency stabilisation.
The 100-10-1 KHz selector knobs, on the control unit, control the autopositioner motor in the translator. The motors position switching contacts which transfer the binary (BCD) information to the positioner. The autopositioner tunes the variable IF filter and provides fine adjustment of the HF amplifier and driver circuit.
The 0.1 KHz signals from the control unit, converted into BCD information by the control data con-



Transceiver : Frequency Stabilisation
And Autopositioning
Figure 003

verter, are applied to the frequency divider stabilizer, by means of the KHz selector knob on the control unit.
The MHz selector knob controls the band motor which ensures fine tuning of the HF oscillator, together with the 17.5 MHz oscillator, and HF amplifier and driver circuits. It also controls the band switch and provides switching of the oscillator for frequencies below 7 MHz.

BCD information from the control data converter are fed to the frequency divider stabilizer.
Two highly stable frequency signals (500 KHz and 100 KHz) are generated by the master oscillator and respectively supplied to the MHz stabiliser and to the frequency divider stabilizer circuit which is fed by the BCD information.
These signals are used as a reference for stabilisation. Frequency stabilisation is obtained by means of two modules :
- The MHz frequency stabiliser, which stabilises the 17.5 KHz and HF oscillators.
- The frequency divider stabiliser, which stabilises the VCO.

(f) VCO (Voltage Controlled Oscillator)

Stabilisation, within the VCO, is ensured by means of a comparison, in a phase-frequency discriminator. The divider stabilizer module includes the appropriate circuits for supplying the 2.5001 to 3.5000 MHz signals from the VCO to the mixers, by 0.1 MHz increments.
Eight stages perform these functions, by means of two oscillators, one of which operates from 2.5001 to 3.0000 MHz and the other from 3.0000 to 3.5000 MHz. The signal, at the frequency selected by means of the 100 KHz selector knob, controls the appropriate oscillator.
The VCO output is controlled by the discriminator output. When the VCO operates at selected frequency, the output level is constant and divider circuit output frequency is 100 Hz. Any change of the frequency selected from the control unit results in a variation of the variable divider output. The phase-frequency discriminator output thus varies, causing a variation in capacitance of the VVC (Voltage Variable Capacitor) of the VCO, until the frequency divider output reaches again 100 Hz, at which frequency the VCO is blocked.

The VCO module output is fed to the translator audio frequency mixer.

(g) Translator (Variable Frequency Changer)

The signal from the IF feed-back amplifier is mixed with the VCO output signal in the audio frequency mixer.
According to the VCO frequency, the mixer output frequency varies from 3 to 2 MHz.
Tuning is obtained by means of the variable IF filter, mechanically controlled by the autopositioner ; the filter output signal is fed to the control unit through one of two possible ways, according to the value of the selected frequency :
- HF signal frequency below 7 MHz
- HF signal frequency above 7 MHz

(g1) HF signal below 7 MHz

The 17.5 MHz oscillator mechanically controlled by the band motor is precisely tuned by means of a varicap type semiconductor. The error voltage is supplied by the MHz frequency stabiliser. The 17.5 MHz signal from the oscillator is applied to the 17.5 MHz mixer, where it is mixed with the HF signal. The resulting signal is fed to the band-pass filter and then to the HF mixer.

(g2) HF signal above 7 MHz

The 17.5 MHz oscillator is no longer energized ; the HF signal from the variable IF filter is applied directly to the mixer, which is also fed by a signal from the HF oscillator, controlled in the same manner as the 17.5 MHz oscillator. Both signals are mixed and the resulting HF signal is fed to the power amplifiers.

(h) Power amplifiers

The HF signal from the translator is amplified to the appropriate antenna feeding level through a chain of power amplifiers.
The carrier amplitude through this chain is controlled by means of the following circuits :

- ALC (Automatic Load Control) circuit

- TGC (Transmitter Gain Control) circuit
- ADC (Automatic Drive Control) circuit

Amplifier band and load switching is made by means of switches driven by the positioning motors.

(i) Tuning control

The impedance (52 ohms) of the power amplifier antenna tuning circuit must be re-adjusted after each frequency change. The roller coil of the power amplifier is adjusted by servo-motor (B2). In the power amplifier circuit, the appropriate combination of band inductance coils is obtained by means of another servo-motor (B1), which is controlled, together with the driver stage, by the band selector.
When the antenna automatic tuner is in use, a 25 ohm resistor in the HF line limits the HF power during the course of the tuning process.
From the output stage, a discriminator, associated with a 400 Hz control loop, feeds an error voltage which, processed and amplified within the loop, controls the servo-motor (B2) adjusting the power amplifier roller coil.

(2) Receive mode

The antenna signal is directly fed, by coupling to the HF amplifiers which are common to the receiver and the transmitter, and then to the receiver mixer, where it is converted, in the same manner as the transmitter signal (as indicated on the transceiver block-diagrams one the frequency stabilisation and autopositioning block-diagram), but by means of separate mixer circuits.
No balanced mixers are used in this mode.
The reception level is automatically controlled (AGC proportional to the audio frequency signal) and manually adjusted from a potentiometer installed on the control unit provided SQ.IN-SQ.OUT switch on transceiver is placed in SQ.OUT position.
From the translator module, the signal is fed to the receiver mixer, and then to an IF amplifier, to the USB or LSB mechanical filter, to a chain of IF amplifiers, and to the product detector, where it is mixed with the 500 KHz carrier.
From the output, the signal is fed to the audio frequency chain and to the output circuit. If the receiver is operated in the AM mode (selection made from the

control unit), the signal is fed to the IF amplifier of the AM chain.
After being amplified, the signal is applied to the 6 KHz mechanical filter, which passes both side bands.
The signal is then amplified through a chain of IF amplifiers, from where it may follow either one of two channels :
- The SELCAL recording and amplifying channel
- The audio channel, previously used in the BLU (USB or LSB) mode.

The audio circuit, common to both types of modulation, is controlled by the squelch circuit made operative by positioning transceiver SQ.IN-SQ.OUT switch in SQ.IN position.

(a) Audio squelch circuit

The audio squelch circuit is included in the HF oscillator module.
It includes two frequency sensitive filters, two detector stages, one comparator and a holding circuit controlling audio squelch relay.
The audio squelch circuit receives from audio amplifiers frequency signals which are converted into DC voltages.
These voltages are compared in a comparator which has a bias determined by manual adjustment of a potentiometer located on the control unit.
After comparison, the holding circuit controls the squelch circuit which :

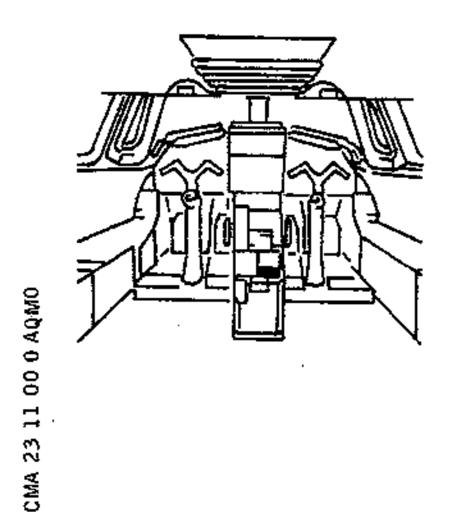
- Connects the audio signals to the audio output and to the headset if the signal present has a sufficient level in relation to noise
- Disconnects the audio signals from the audio output and from the headset by connecting a load resistor if noise level predominates.

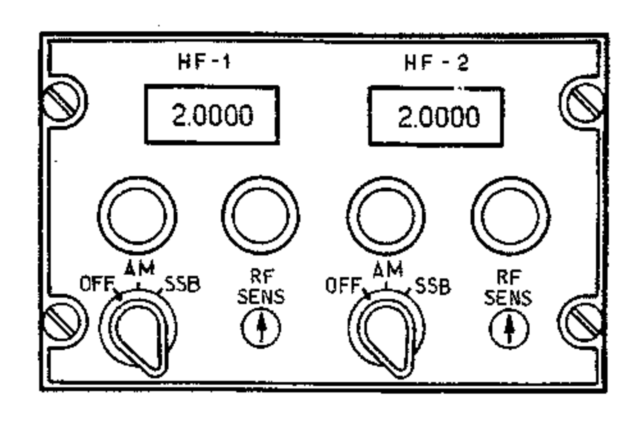
4. Control Unit-GABLES G3751

A. General

This dual control unit allows remote controlled display of operating frequencies for both HF installations.
Two different frequencies can be selected simultaneously and also displayed and checked by means of frequency indicators visible through windows on the front panel of the unit. One is the HF1 installation operating frequency, the other being the HF2 installation operating frequency.

B. Description and Operation (Ref. Fig. 004)





Control Unit : Front View
Figure 004

(1) The front panel carries :

(a) On the LH side, the HF1 installation controls, consisting of :

(a1) A frequency display window

A frequency indicator fitted behind a window, provides a digital check of the operation frequency selected by means of selector knobs.

(a2) Two double knurled frequency selector knobs

These double knobs are located under the frequency display window. They allow :

- The selection of tens and units of MHz (LH side knob).

- The selection of tenths, hundredths,
R B thousandths of MHz (RH side knob).

R NOTE : Selection of ten thousandths of MHz is
R not used with COLLINS 618T2 or 618T5
R transceivers

(a3) A three position OFF-AM-SSB function selector switch

- In the OFF position, the HF installation is not energized.
- In the AM position, the HF installation operates in the Amplitude Modulation mode.
- In the SSB (Single Side Band) position, the HF installation operates in the Upper Side Band mode.

NOTE : When set to either the AM or the SSB mode, an HF installation will operate only after a 2 minutes delay.

(a4) A RF. SENS knurled knob

A potentiometer adjusted manually by means of RF. SENS knob controls HF transceiver sensitivity by polarization of HF amplifier stages and receive LF mixer stages in both operating modes.

(b) On the RH side, the HF2 installation controls

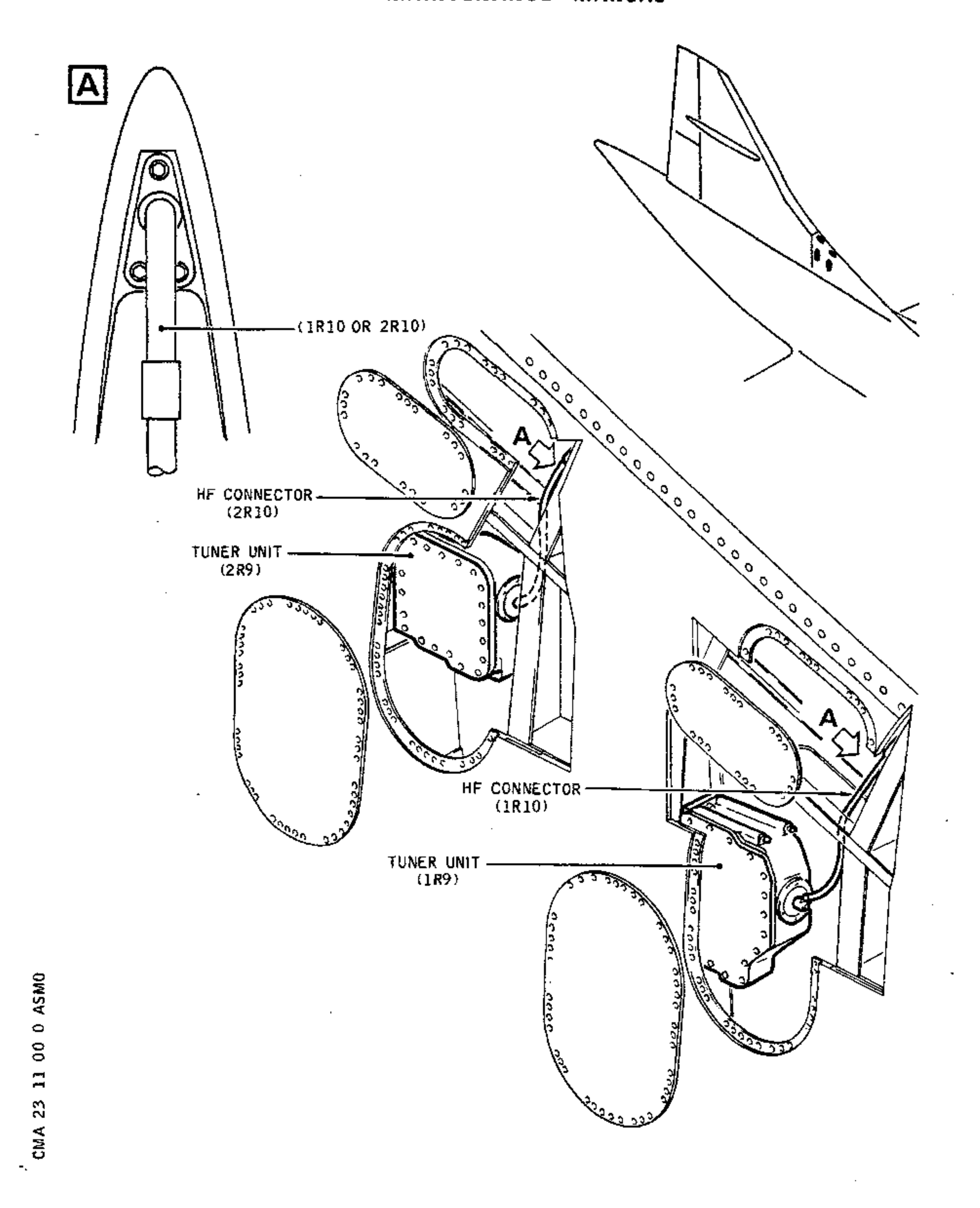
The lay-out and the functions performed are identical with those of the relevant HF1 installation controls.

(2) The rear panel carries two connectors for connection of the control unit to the aircraft electrical network.

R 5. Antenna Tuner Unit

A. Description (Ref. Fig. 005)

Each transceiver is equipped with a separate antenna assembly. The integral HF antenna is so designed to eliminate both the drag and the statics associated with wires or any other forms of conventional antennas. The radiating portion of the antenna is therefore incorporated within contours of the aircraft structure.
The technique used consists of energizing the aircraft



CMA 23 11 00 0 ASM0

HF : Location of Integral Antennas
Figure 005

metal skin by the HF transmission signals, which are thus radiated by the entire aircraft structure. It implies cutting a notch, or slot, in the aircraft structure, in a zone where the current density is high (a zone of high curvature).
The notch assembly must be accurately tuned to each transmission frequency and its impedance must be matched with the transceiver output impedance (approximately 50 ohms), in order to obtain a high power factor.
The three main components of an integral antenna are :

- The selector unit
- The HF tuner unit
- The HF connector

(1) Selector unit

NOTE : One of two types of selector unit may be used on the aircraft. Only their size and their internal design are different, operation of the two units being identical.
In old-type units the control circuits make use of relays.
In new-type units the control circuits make use of logic circuits.

The main components of the selector unit are :

- Two servo-amplifiers which control the tuning circuits in the HF tuner unit.
- The control circuits which regulate the various tuning operation sequences.

The servo-amplifiers are controlled by discriminator circuits, in the HF control unit, which detect the correct tuning and matching positions of variable components. The unit also includes locking, safety and checking devices for the antenna system.
The selector unit carries a galvanometer, associated with the SA-AIR push-button, which provides system check facility, and two push-buttons which can be used to test the antenna system.

(a) When the SA-AIR push-button is in the reset position, the galvanometer indicates the level of the reflectometer signal from the HF tuner unit output :

- 1 division on the dial graduation corresponds to a 1.3 to 1 standing wave ratio (SWR), with an HF power approximately equal to 100 W.

(b) When the SA-AIR push-button is pressed, the coloured sectors on the galvanometer dial scale indicate the pressure within the tuning unit. The pressure is satisfactory when the galvanometer pointer is in the upper green dial sector. In case of complete pressure failure (red sector), the tuning side-tone can be heard permanently in the earphones.

After SB 23-024 For A/C 001-007,

(1) Selector unit

NOTE : One of two types of selector unit may be used on the aircraft. Only their size and their internal design are different, operation of the two units being identical.
In old-type units the control circuits make use of relays.
In new-type units the control circuits make use of logic circuits.

The main components of the selector unit are :

- Two servo-amplifiers which control the tuning circuits in the HF tuner unit.
- The control circuits which regulate the various tuning operation sequences.

The servo-amplifiers are controlled by discriminator circuits, in the HF control unit, which detect the correct tuning and matching positions of variable components. The unit also includes locking, safety and checking devices for the antenna system.
The selector unit carries a galvanometer, associated with the SA-AIR push-button, which provides system check facility, two push-buttons which can be used to test the antenna system and FAULT PRESS magnetic indicator associated with RESET PRESS push-button which stores any pressure leakage within the tuner unit.

(a) When the SA-AIR push-button is in the reset position, the galvanometer indicates the level of the reflectometer signal from the HF tuner unit output :

- 1 division on the dial graduation corresponds to a 1.3 to 1 standing wave ratio (SWR), with an HF power approximately equal to 100 W.

R (b) When the SA-AIR push-button is pressed, the
R coloured sectors on the galvanometer dial scale
R indicate the pressure within the tuner unit.
R The pressure is correct when the galvanometer
R pointer is in the upper green dial sector and
R FAULT PRESS magnetic indicator shows a dark
R colour (black).
R In case of complete pressure failure (red sector),
R the tuning side-tone can be heard permanently in
R the earphones and FAULT PRESS magnetic indicator
R shows a light colour (yellow or white).

(c) Pressing the START and KEY push-buttons makes it possible to reset the system and to start a new tuning cycle.

(2) Tuner unit

<u>NOTE</u> : One of two types of tuner unit may be used on the aircraft. Only their size and their internal design are different, operation of the two units being identical.
A new-type tuner unit must be installed with the new-type selector unit with which it is matched.

The HF tuner unit is located within the notch in the aircraft structure and includes the resonant circuit variable components :

- The motor controlled vacuum capacitor, which tunes the notch assembly to resonance.
- A matching coil, with a motor-controlled tap, which provides matching of the notch assembly impedance with the transceiver output impedance.

The antenna frequency range is extended by means of four capacitors connected in parallel with the variable capacitor. They are energized through four vacuum switches, controlled by the selector unit circuits.
The appropriate tuning and impedance matching positions are detected by means of two discriminator circuits, a third circuit providing the SWR indication.
The tuner unit is provided with pressure gauges which allow for automatic isolation of the transceiver and of the antenna system in case of a pressure decrease below the safe level within the tuner unit.

(3) HF connectors

Both HF connectors have the same function and the same

characteristics, but their shapes are different, each of them being designed for the relevant antenna. Each connector is a low loss inductance coil included between the HF tuner unit resonant circuit and the opposite internal face of the notch, thus closing the notch assembly circuit. The small amplitude relative motions of the notch internal faces are absorbed by means of bellows located within the HF connector in order to prevent it from being damaged.

B. Operation

(1) Tuning sequence

The tuning sequence of an antenna system consists of three phases :

- Pre-adjustment
- Capacitor tuning
- Impedance matching and fine tuning

As soon as a given frequency value is selected on the transceiver, a START signal is supplied to the selector unit and initiates the tuning cycle.

(a) Pre-adjustment

The pre-adjustment is obtained by energizing an adjustable capacitor and an impedance matching inductance coil, in the HF tuner unit resonant circuit, until their impedance builds up to a maximum. The antenna system is then in condition to receive HF signals when the transceiver has been tuned to the new operating frequency. HF signals are applied to the tuner unit at a reduced level while the antenna tuning takes place.

(b) Capacitor tuning

While capacitor is being tuned, a phase discriminator in the tuner unit provides the corrective data for setting the antenna to resonance. The adjustment is effected by means of the variable tuning capacitor, controlled by the error signals from the selector unit which have been processed through the phase discriminator. This discriminator detects whether the tuning capacitor is of sufficient capacitance for the new frequency. If not the signals from the discriminator energize the selector unit circuits and cause the required

number of fixed capacitors to be switched in parallel.

(c) Impedance matching and fine tuning

The impedance matching and fine tuning phase begins when the notch has been tuned to resonance by means of the variable capacitor in the tuner unit.
The error signals from the selector unit control the position of a tap on the inductance coil. These signals from the discriminator cause the selector unit to drive the tap until the resonant circuit presents a load impedance of approximately 50 ohms to the transceiver output. Once the resonant circuit is tuned to the new frequency and is correctly matched, the selector unit releases the key and tune lines, so that the transceiver can then transmit or receive. During any further operation on the selected frequency, both servos will automatically correct any possible errors caused by a variation in the aircraft impedance.
The tuning cycle is monitored to the operator by means of an audio frequency sidetone, except when the "in-flight" corrections are made.

(2) Protection and Safety devices

The integral protection circuits are as follows :

(a) Transmitter protection circuit

It is located in the selector unit, and its purposes are :

- To cut off the HF power applied to the notch assembly after a 15 seconds timing period.
- To prevent the transceiver from being subjected to a mismatched load, in case of a tuning breakdown.

(b) Interlock circuit

It is located in the tuner unit and provides :

- Inhibition of one antenna system while the other one is being tuned or used for transmission.
- Priority of one notch assembly in case of simultaneous transmissions or channel changing.

(c) Pressure gauge

It is located in the HF tuner unit ; it locks the system tuning and cuts off the HF power whenever the pressure within the tuner unit drops to an abnormal value.

6. HF System Operation
(Ref. Fig. 006)

A. Normal Operation

(1) Power supply

The HF system is powered by :

- 28 VDC, through circuit breakers 1R3 and 2R3
- 115 VAC - 400 Hz, through 3-phase circuit breakers 1R4 and 2R4.

(2) Energizing

Energizing of the HF system is effected by means of the control unit selector switch placed :

- In the AM position when the selected installation is to operate in the amplitude modulation mode.
- In the SSB (Single Side Band) position, when the selected installation is to operate in the Upper Side Band mode.

(3) Transceiver tuning

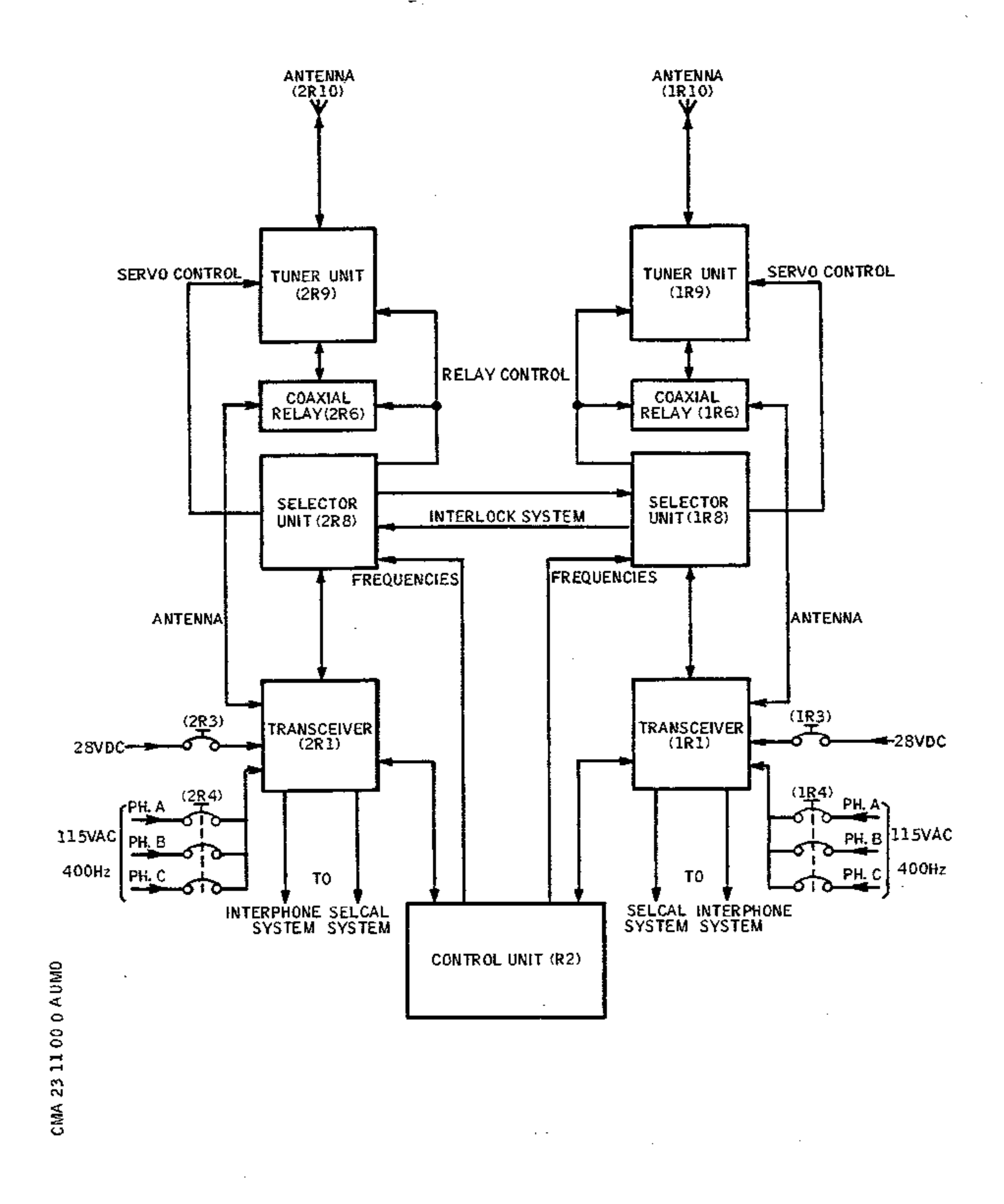
The selection of the transceiver operating frequencies displayed on the control unit is automatically made by a servo assembly including a servo-motor and an autopositioner. The tuning time does not exceed 8 seconds. The receiver is partly blocked during that time.

(4) Antenna

The antenna is of a built-in notch type and its radiating portion is the aircraft structure itself.
It comprises two main units and two HF connectors, which supply the HF power from the transceiver to the aircraft structure.

(a) Tuner unit

The tuner unit which is a pressurized component,



HF - Block Diagram
Figure 006

sets the notch assembly to resonance and matches its impedance with the transceiver output impedance.
It is fitted within the notch and controlled by the selector unit.

(b) Selector unit

The selector unit is located at the rear left part of the electronics rack ; it is connected to both the transceiver control circuit and the tuner unit.
It converts the signals from the transceiver into feedback signals for the tuner unit, throughout the various tuning sequences.

(5) Protection and safety devices

(a) Interlock (Ref. Fig. 007)

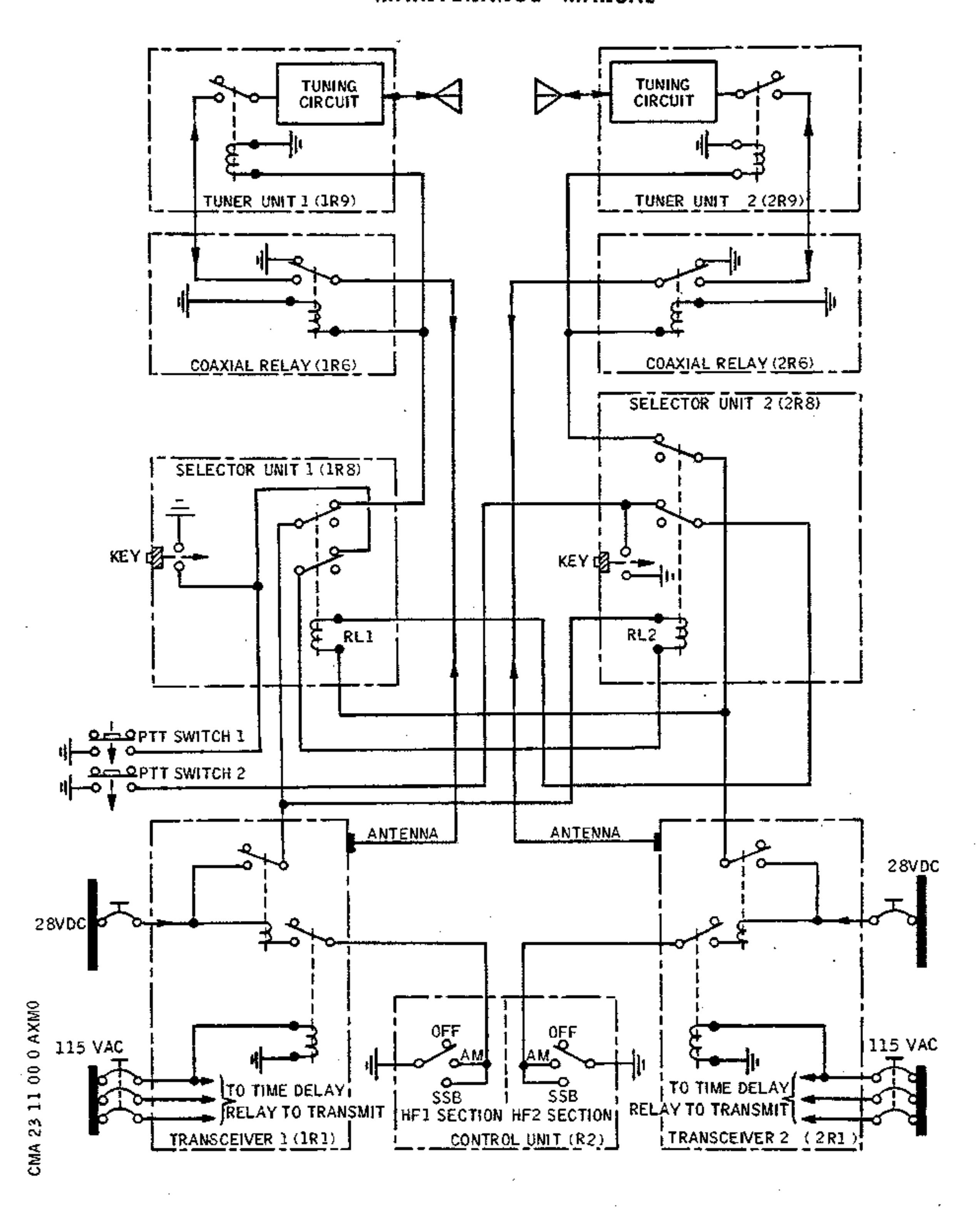
On the dual control unit, with selector switches placed in AM or SSB position, transceiver relays are energized and the 28VDC voltage is fed to the interlock system which controls :

(a1) In receive mode :
- switching of the antenna circuit between transceiver and associated tuner units through coaxial relays.

(a2) In transmit mode :
- grounding of the antenna circuit associated with the installation not in use presently.

These functions are achieved by means of interlock relays in the selector units and of disable relays in the tuner units.

The interlock system operates as follows :
- as soon as HF systems are energized, the normally closed contacts of interlock relays RL1 and RL2 in the selector units provide switching of the relevant antenna to the receive mode.
Pressing PTT switch 1 energizes interlock relay 2 (RL2), which disconnects and grounds antenna 2, and initiates the appropriate switching sequence on transceiver 1. Simultaneously, the interlock relay 2 (RL2) inhibits any undesired transmission from



- HF - Interlock System
Figure 007

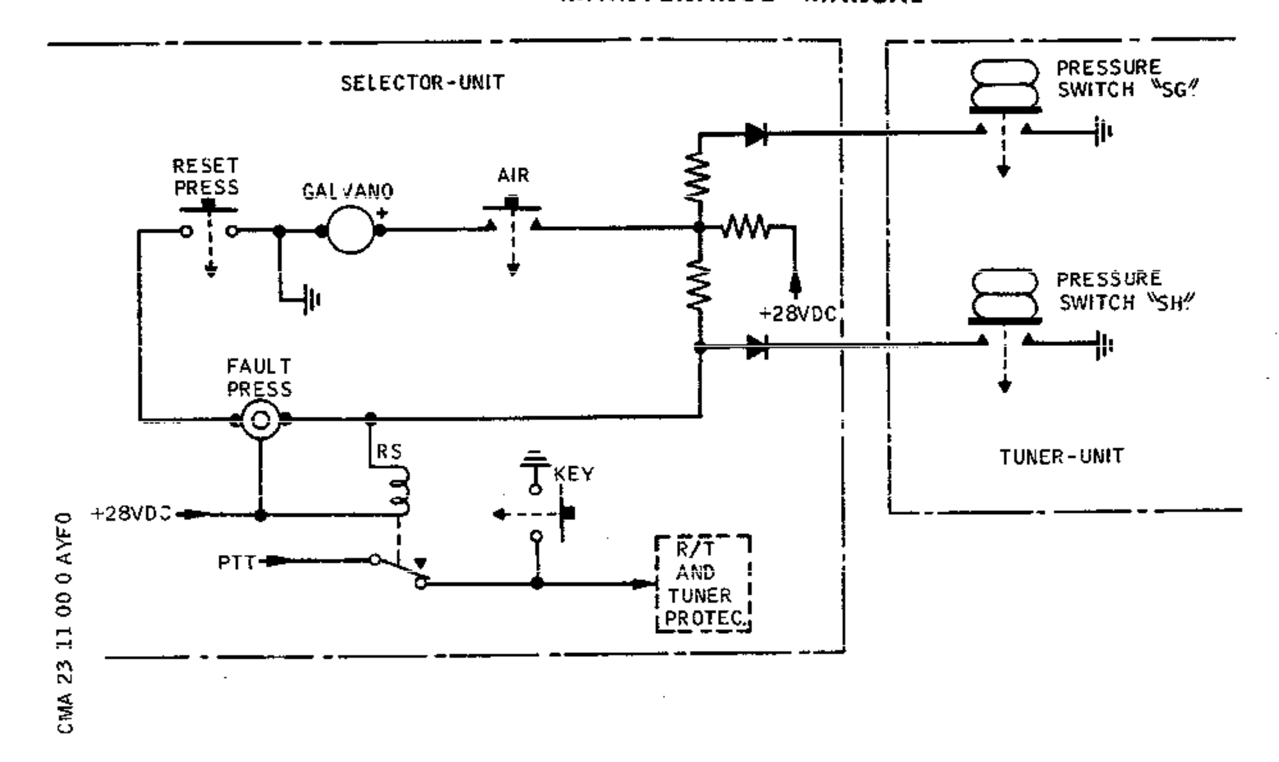
transceiver 2.
The disable relay in the tuner unit 2 is de-energized, thus inhibiting operation of the resonant circuits of tuner unit 2.
When PTT switch 1 is released, the interlock relay 2 (RL2) is de-energized, the disable relay in tuner unit 2 is energized and both systems are set back to their initial configuration (receive mode).
Pressing PTT switch 2 energizes interlock relay 1 (RL1), which disconnects and grounds antenna 1 and initiates the appropriate switching sequence on transceiver 2.
Simultaneously the interlock relay 1 (RL1) inhibits any undesired transmission from transceiver 1.
The disable relay in the tuner unit 1 is de-energized, thus inhibiting operation of the resonant circuits of tuner unit 1.
When PTT switch 2 is released, the interlock relay 1 (RL1) is de-energized, the disable relay in tuner unit 1 is energized and both systems are set back to their initial configuration (receive mode).
Pressing PTT switch 2 disconnects antenna 1 from the associated system and system 2 is set to transmit mode. If PTT switch 1 is pressed while holding PTT switch 2 pressed, the ground cannot be applied to interlock relay 2 (RL2) which holds the circuit of antenna 2 in transmit mode.
If HF1 system is set to transmit mode and PTT switch 2 is pressed, HF1 system remains in transmit mode.
Priority in transmit mode is thus taken by the HF system first selected.

(b) Tuner unit pressurization

Two pressure switches associated with a galvanometer located on selector unit provide :
- Indication of non detrimental pressure drop as regards tuner unit operation.
- Switching out of tuning circuit for detrimental pressure drop as regards tuner unit operation.

R After SB 23-024 For A/C 001-007,

R (b) Tuner unit pressurization (Ref. Fig. 008)



Tuner Unit Low Pressure Indicating Circuit
R Figure 008

R Tuner unit pressurization is of 20 psi
R (1.4 kg/CM²) approximately.
R Two pressure switches, respectively SG (set to
R 14 psi) and SH (set to 8.5 psi), are installed
R in the tuner unit and enable by grounding, a
R visual indication to be displayed on selector
R galvanometer in case of pressure leakage and
R with AIR push-button pressed.

R (b1) When pressure inside the tuner unit is
R lower or equal to 14 psi (0.98 kg/cm²),
R SG pressure switch is closed thus enabling
R the indication of a non detrimental pres-
R sure drop as regards tuner unit operation
R to be read on selector galvanometer (center
R sector of the dial).

R (b2) When pressure inside the tuner unit is lower
R or equal to 8.5 psi (0.59 kg/cm²), SH
R pressure switch is closed thus enabling
R the indication of a detrimental pressure
R drop as regards tuner unit operation to be

R read on selector galvanometer (red sector
R of the dial).

R In the same time :

R - FAULT PRESS magnetic indicator power
R supplied by SH pressure switch is ener-
R gized and displays yellow or white to
R indicate a pressure leakage (this indi-
R cator remains energized even if the
R pressure increases to a greater value
R than 8.5 psi, while SH pressure switch
R returns to a non energized position.
R - RS safety relay is power supplied by SH
R pressure switch and cuts supply to KEY
R line thus preventing transmission.

(6) Audio circuit regulation (Ref. Fig. 009)

The audio circuit uses two operating modes, one mode for reception selected by means of SQ.IN-SQ.OUT switch located behind the front panel cover of the transceiver, the other mode for sidetone check.

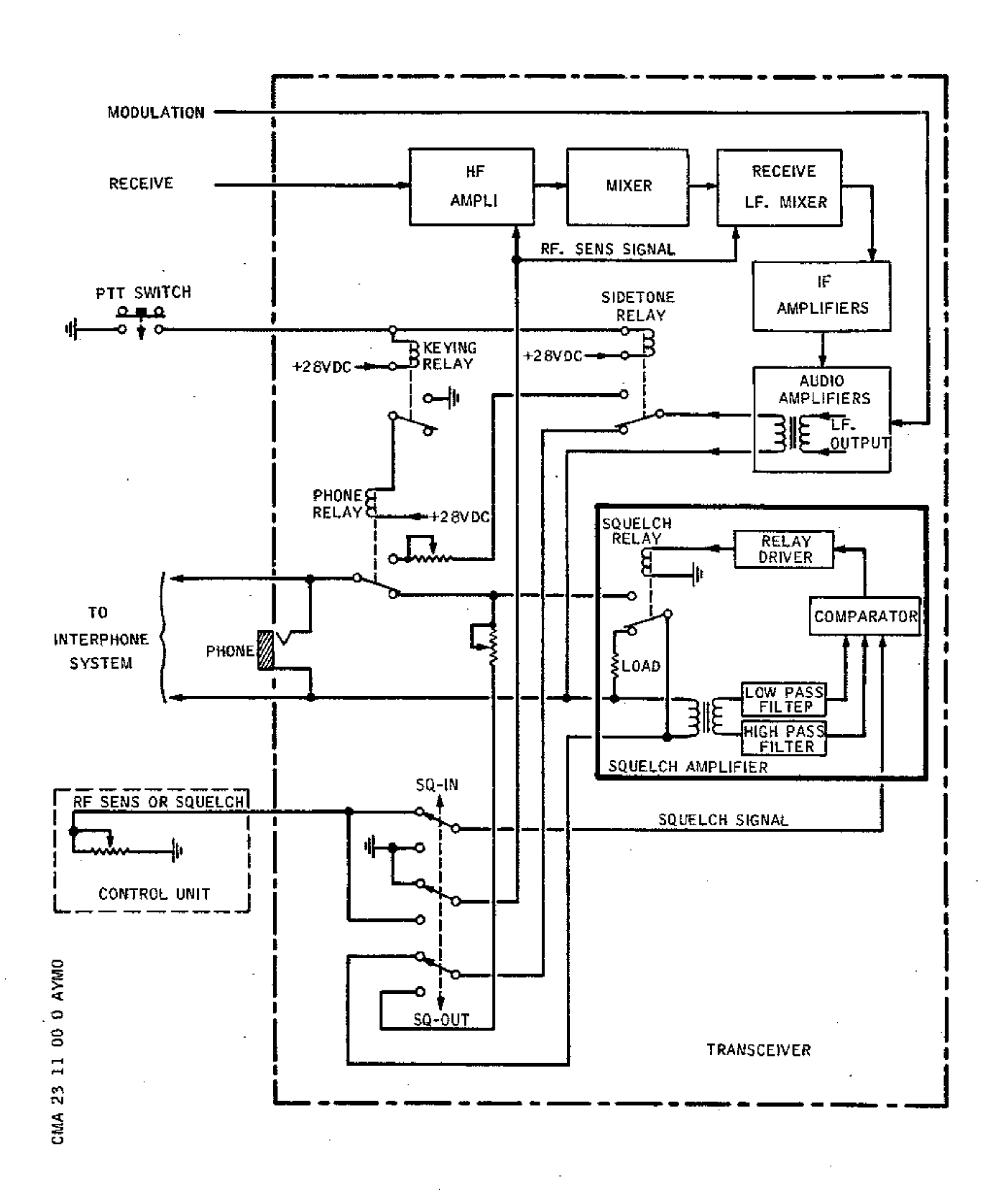
(a) Reception using SQ.IN-SQ.OUT switch

(a1) Switch placed in SQ.IN position

With switch placed in SQ.IN position, the potentiometer on control unit, feeds a bias signal (through manual adjustment) to the comparator of the squelch amplifier stage while RF SENS line to HF amplifier stage and to receive LF mixer is connected to ground.

The signal fed to the transceiver is applied to HF amplifier stage. Then after being processed in the various stages the audio frequency is applied to the output of side-tone relay which, de-energized, transmits the signal to the squelch amplifier input transformer via a contact of SQ.IN-SQ.OUT switch.
The audio frequency detected by the filters is applied to the comparator which, biased through manual adjustment, allows :

- The relay driver to energize squelch relay and to apply audio frequency signal to the interphone system and to PHONE jack on the transceiver via PHONE relay which is de-energized provided audio



HF System : Audio Circuit Regulation
Figure 009

frequency signal predominates over the noise
- To de-energize relay driver and to apply audio frequency signal to a load resistor if the audio signal is lower than noise level.

(a2) Switch placed in SQ.OUT position

With switch placed in SQ.OUT position, the potentiometer on control unit feeds a bias signal (through manual adjustment) to HF amplifier and receive LF mixer stages while squelch signal is grounded.

The signal fed to the transceiver is applied to HF amplifier, mixer and receive LF mixer stages biased through manual adjustment of the potentiometer. After being processed in the various stages, the audio frequency signal is applied to the output of sidetone relay which, de-energized, transmits the signal via contact of SQ.IN-SQ.OUT switch to a potentiometer (threshold adjusted in laboratory). The audio signal is then applied to the interphone system and to the PHONE jack of the transceiver via PHONE relay which is de-energized.
In this phase the squelch amplifier stage is no longer operative.

(b) Sidetone

In sidetone mode, SQ.IN-SQ.OUT switch can be in either position.
The modulated signal is applied to the audio-amplifiers, then to the transmit circuit.
During modulation, the PTT switch is held pressed, thus applying a ground signal to keying and sidetone relays which are energized. The audio signal is fed to the potentiometer (threshold adjusted in laboratory). The audio signal is applied to PHONE relay energized by keying relay ; then it is applied to the interphone system and to PHONE jack on the transceiver.

B. Tests

(1) Transceiver

The front panel carries a five position rotary selector switch. The first four positions allow to read voltages on an associated galvanometer. The fifth position is used for frequency calibration.

(2) Selector unit

The selector unit front panel carries a galvanometer and three push-buttons ; the START and KEY push-buttons control the starting of a new tuning sequence and its configuration.
R The SA-AIR push-button enable reading on the galvano-
R meter of the pressure inside the tuner unit.

R After SB 23-024 For A/C 001-007,

R (2) Selector unit
R The selector unit front panel carries a galvanometer,
R four push-buttons and a magnetic indicator. START and
R KEY push-buttons control the starting of a new tuning
R sequence and its configuration.
R AIR push-button enable reading on the galvanometer of
R the pressure inside the tuner unit.
R RESET PRESS push-button enables deactivation of FAULT
R PRESS magnetic indicator in the case of a pressure
R leakage inside the tuner unit. After resetting the
R magnetic indicator will display a dark colour (black).

C. Operation in Conjunction with the SELCAL System

When a ground radio station requests a radio communication with a particular aircraft, it transmits a coded signal, which is received, at the transmission frequency, by the antenna of the selected HF installation. This coded signal is fed to the relevant receiver, demodulated and supplied to the SELCAL decoder, which informs the crew of the request from the ground station by means of a visual and aural monitoring system.

R WARNING : OBSERVE THE SAFETY AND TECHNICAL PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the HF system to be quickly rectified.
The defects can be isolated with the aid of trouble shooting procedures (Ref. Para 3) and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be required. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.
Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available, unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101). As the two HF systems are identical, trouble shooting procedures are described for HF1 system. For HF2 system, refer to numbers between parentheses.

2. Prepare

A. Remove panels 243 and 244 GS to gain access to shelves in rear electronics racks.

B. Make certain that all PTT switches are in intermediate position.

C. On Captain's (First Officer's) jack panel, connect a boomset to relevant jack.

D. Make certain that the switch selecting use of boomset or oxygen mask microphone is placed in BOOM position.

E. On audio selector panels, make certain :

(1) That all keys on keyboard are disengaged

(2) That no reception is selected by the push-buttons

F. On HF dual control unit, make certain that function selector switches are in OFF position.

G. Make certain that circuit breakers associated with HF system are set (Ref. 23-11-00, Adjustment/Test)

H. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

I. Operate electronics rack ventilation (Ref. 21-21-00).

J. On Captain's (First Officer's) audio selector panel, select reception by means of HF1 (HF2) push-button and turn the associated integral potentiometer to intermediate position to obtain a medium audio level.

WARNING : TRANSMITTING ON HF SYSTEMS IS PROHIBITED DURING REPLENESHING OF AIRCRAFT FUEL TANKS.

3. Trouble Shooting

```
****************************************************
*On lower centre console 9-211, on HF dual control  *
*unit [15], place function selector switch of HF1   *
*(HF2) system in AM position. Background noise is   *
*heard in boomset earphones. If:                    *
****************************************************
   ||    |          ---------------------------------------------------
   OK    |-NOT OK--|No background noise, Ref. Chart 101.              |
   ||               ---------------------------------------------------
****************************************************
*On HF dual control unit [15], on system in service,*
*display a frequency in middle of the band.         *
*On upper centre console 7-211, on Captain's [16]   *
*(First Officer's [17]) audio selector panel, engage*
*HF1 (HF2) key on keyboard; place PTT switch in RAD *
*position.A 1000 Hz signal is heard in boomset ear- *
*phones. If:                                        *
****************************************************
   ||    |          ---------------------------------------------------
   OK    |-NOT OK--|Check tuning. Ref. Chart 102.                     |
   ||               ---------------------------------------------------
****************************************************
*Place and hold PTT switch in RAD position and speak*
*into boomset microphone. The voice is heard in     *
*boomset earphones. If:                             *
****************************************************
   ||    |          ---------------------------------------------------
   OK    |-NOT OK--|No sidetone. Ref. Chart 103.                      |
   ||               ---------------------------------------------------
****************************************************
*On HF dual control unit [15], on system in service,*
*display frequency of the station with which contact*
*is to be estabilished.                             *
*Place and hold PTT switch in RAD position and speak*
*into boomset microphone. If:                       *
****************************************************
   ||    |          ---------------------------------------------------
   OK    |-NOT OK--|Check transmission. Ref. Chart 104.               |
   ||    |          ---------------------------------------------------
   ||
   ||
   ||
   ||
   ||
   ||
```

```
       ||
   ***************************************************
   *On HF dual control unit [15], set both HF systems  *
   *to operate by placing function selector switches in*
   *AM position ; display the same frequency on both   *
   *systems. Wait 2 minutes.                           *
   *On rear electronics rack :                         *
R  *(1) On front panel of HF1 [1] and HF2 [2] transcei-*
   *    vers, place selector switch in PA-MA position. *
   *(2) On selector unit [7] ([8]), press KEY push-    *
   *    button, the pointer of transceiver [1] ([2])   *
   *    galvanometer deflects. While holding KEY push- *
   *    button pressed, on other selector unit [8]     *
   *    ([7]), press KEY push-button : the pointer of  *
   *    transceiver [2] ([1]) galvanometer does not    *
   *    deflect.                                       *
   ***************************************************
       ||    |
       ||    |      ------------------------------------------------
       ||    |      |Failure of interlock circuit. Replace faulty    |
       OK    |-NOT OK--|selector unit [8] ([7]).                      |
       ||           ------------------------------------------------
       ||
   ***************************************************
   *HF system is serviceable.                          *
   ***************************************************
```

```
*************************************-----------------------------
*NO BACKGROUND NOISE.               *|GROUND EQUIPMENT REQUIRED  |
*************************************|---------------------------|
                                     |DESCRIPTION        PART NO.|
                                     |---------------------------|
                                     |MULTIMETER             -   |
                                     |HEADSET                -   |
                                     -----------------------------

*****************************************************
*Reception at Captain's [16] (First Officer's [17])  *
*audio selector panel, repeat test from other audio  *
*selector panel [16, 17, 18 or 19]. Background noise *
*is heard in boomset earphones.                      *
*****************************************************
   |    |     -------------------------------------------
   NO   |-YES---|Replace faulty audio selector panel [16, 17, 18 |
   |            |or 19].                                          |
   |            -------------------------------------------
*****************************************************
*In zone 243 (244), in rear electronics rack, connect *
*a headset to PHONE jack on front panel of HF1 [1]    *
*(HF2 [2]) transceiver. Background noise is heard.    *
*****************************************************
   |    |     -------------------------------------------
   NO   |-YES---|Ref. 23-41-00, Trouble Shooting.                 |
   |            -------------------------------------------
*****************************************************
*In zone 243 (244), in rear electronics rack, on      *
*HF1 [1] (HF2 [2]) transceiver, check if fan          *
*operates correctly.                                  *
*****************************************************
   |    |     -------------------------------------------
   NO   |-YES---|Replace HF1 [1] (HF2 [2]) transceiver.           |
   |            -------------------------------------------
*****************************************************
*On front panel of HF1 [1] (HF2 [2]) transceiver,     *
*place selector switch in 28V position. Check if      *
*galvanometer pointer is in red sector of the dial.   *
*****************************************************
   |    |
   |    |
   |    |
   |    |
   |    |
   |    |
   |    |
```

Chart 101 (Sheet 1 of 2)

NO

-YES---

On front panel of HF1 [1] (HF2 [2]) transceiver, place selector switch in 130V position. Check if galvanometer pointer deflects in red sector of the dial.

YES

NO

Check 28VDC at output of circuit breaker [3] ([4]).

Replace HF1 [1] (HF2 [2]) transceiver.

Check 115VAC at output of circuit breaker [5] ([6])

NO

NO

Replace circuit breaker [3] ([4]).

Replace circuit breaker [5] ([6]).

Chart 101 (Sheet 2 of 2)

*CHECK OF TUNING. IN REAR ELECTRONICS RACK, CONNECT HEADSET TO PHONE JACK OF HF1 [1] (HF2 [2]) transceiver.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-
HEADSET	-

*Tuning signal longer than normal. In rear electronics rack, on selector unit [7] ([8]), press SA-AIR push-button. Galvanometer pointer deflects in upper green sector of dial.

- NO →
  - Pressurize tuner unit [9] ([10]). Ref. 23-11-44 Servicing
  - NOT OK → Abnormal pressure drop. Replace tuner unit [9] ([10]).
- YES → (continues below)

*No tuning signal. In rear electronics rack, on selector unit [7] ([8]), press START push-button. Tuning signal is heard in boomset earphones.

- YES → Replace HF1 [1] (HF2 [2]) transceiver.
- NO → Replace HF selector unit [7] ([8]).
  - -NOT OK- → Replace tuner unit [9] ([10]).

*On HF dual control unit [15], place HF1 (HF2) system function selector switch in OFF position. Trip circuit breakers [3,5] ([4,6]). In electronics rack, shelf 1-243, interchange HF selector units [7] and ([8]). Reset circuit breakers [3,5] ([4,6]). On HF dual control unit [15], place HF1 (HF2) system function selector switch in AM position; the abnormally long 1000 Hz signal is still heard.

Chart 102 (Sheet 1 of 2)

```
      |                  |
     YES                 NO
      |                  |
      |                -----------------------------------------------------
      |                |Replace HF selector unit [7] ([8]).                 |
      |                -----------------------------------------------------
*********************************************************
*On shelf 2-243 (2-244), disconnect cables 1R6B and    *
*1R6C (2R6B and 2R6C) from co-axial relay [11] ([12]). *
*Check continuity between both connectors on co-axial  *
*relay. There is continuity.                           *
*********************************************************
      |                  |
     YES                 NO
      |                  |
      |                -----------------------------------------------------
      |                |Replace co-axial relay [11] ([12]).                 |
      |                -----------------------------------------------------
------------------------------------------------
|Replace HF1 [1] (HF2 [2]) transceiver.        |
------------------------------------------------
                         |            --------------------------------------
                         |-NOT OK-|Replace tuner unit [9] ([10]).          |
                                      --------------------------------------
```

Chart 102 (Sheet 2 of 2)

After SB 23-024 For A/C 001-007,

CHECK OF TUNING. IN REAR ELECTRONICS RACK, CONNECT HEADSET TO PHONE JACK OF HF1 [1] (HF2 [2]) transceiver.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-
HEADSET	-

Tuning signal is still heard. In rear electronics rack, on selector unit [7] ([8]), check that FAULT PRESS magnetic indicator is dark (black). If

- YES → (continues below)
- NO → Magnetic indicator is light (white or yellow), replace tuner unit [9] ([10]).

No tuning signal. In rear electronics rack, on selector unit [7] ([8]), press START push-button. Tuning signal is heard in boomset earphones.

- YES → Replace HF1 [1] (HF2 [2]) transceiver.
- NO → Replace HF selector unit [7] ([8]).
  - -NOT OK- → Replace tuner unit [9] ([10]).

On HF dual control unit [15], place HF1 (HF2) system function selector switch in OFF position. Trip circuit breakers [3,5] ([4,6]). In electronics rack, shelf 1-243, interchange HF selector units [7] and ([8]). Reset circuit breakers [3,5] ([4,6]). On HF dual control unit [15], place HF1 (HF2) system function selector switch in AM position; the abnormally long 1000 Hz signal is still heard.

Chart 102 (Sheet 1 of 2)

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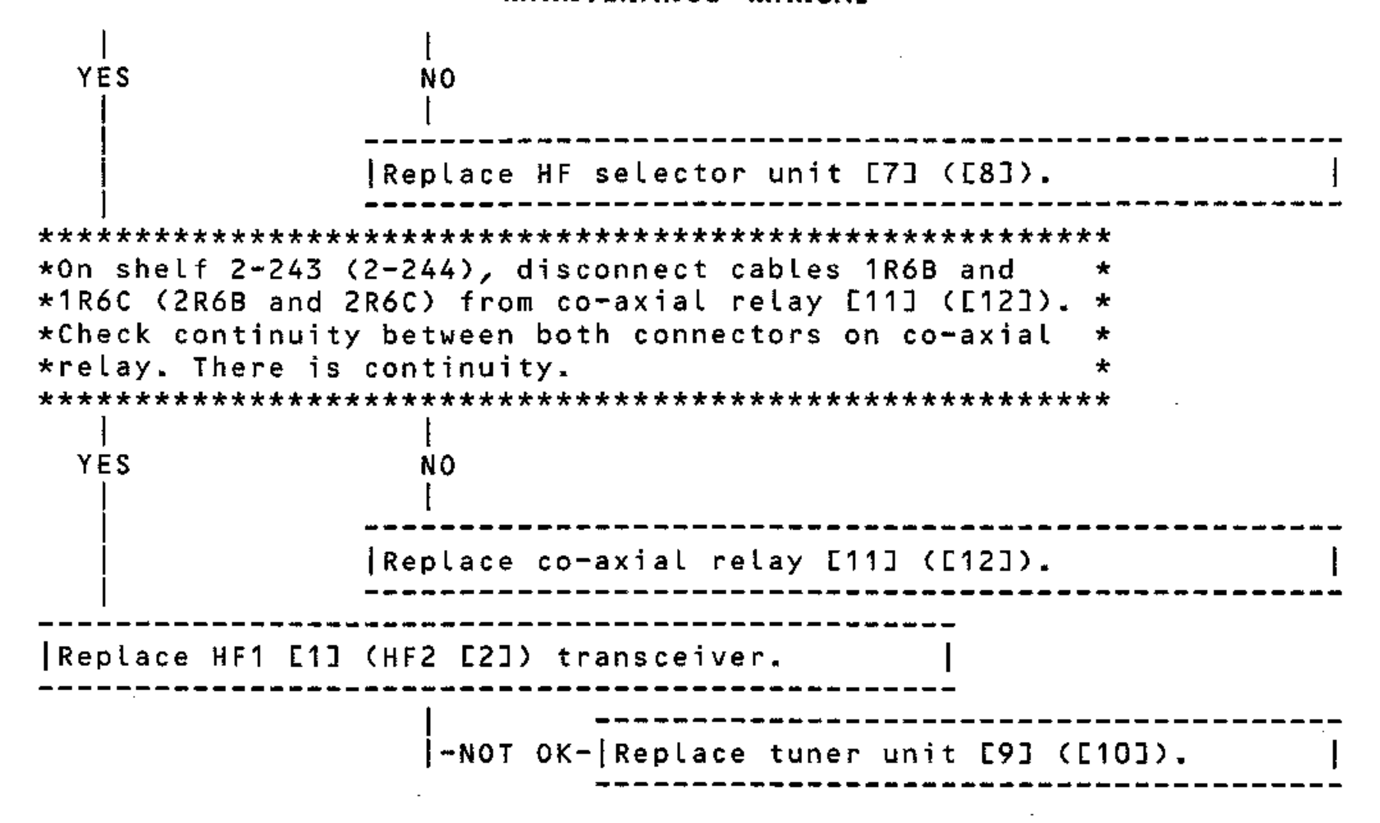


Chart 102 (Sheet 2 of 2)

NO SIDETONE.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
HEADSET	-
MICROPHONE	-

Reception at Captain's [16] (First Officer's [17]) audio selector panel, repeat test from other audio selector panel [16, 17, 18 or 19]. Voice is heard in boomset earphones.

NO → (continue below)

YES → Replace faulty audio selector panel [16, 17, 18 or 19].

In zone 243 (244), in rear electronics rack, on front panel of HF1 [1] (HF2 [2]) transceiver, connect:
-a headset to PHONE jack
-a microphone to MIC jack
On shelf 1-243, on HF selector unit [7] ([8]), press KEY push-button then speak into microphone. Voice is heard in headset.

NO → Replace HF1 [1] (HF2 [2]) transceiver.

YES → Ref. 23-41-00, Trouble Shooting.

Chart 103

```
*************************************-------------------------------
*TRANSMISSION CHECK.                *|GROUND EQUIPMENT REQUIRED    |
*************************************|------------------------------|
                                     |DESCRIPTION        PART NO.   |
                                     |------------------------------|
                                     |HEADSET                -      |
                                     |MICROPHONE             -      |
                                     -------------------------------

************************************************************
*In zone 243 (244), in rear electronics rack, on front    *
*panel of HF1 [1] (HF2 [2]) transceiver, connect:         *
*-a headset to PHONE jack                                  *
*-a microphone to MIC jack                                 *
*On shelf 1-243, on HF selector unit [7] ([8]), press KEY*
*push-button then speak into microphone. Check on HF [1] *
*([2]) transceiver :                                       *
*-that fan rotational speed has increased                  *
*-that when placing selector switch on front panel in      *
* 1500V position, galvanometer pointer is in red sector    *
*of dial                                                   *
*-that when placing selector switch in PA-MA position,     *
* galvanometer pointer deflects according to modulation. *
************************************************************
   |              |     ------------------------------------------
  YES             |-NO-|Replace HF1 [1] (HF2 [2]) transceiver.    |
   |                    ------------------------------------------
------------------------------------------------------------
|On shelf 1-243, check during transmission that on HF       |
|selector unit [7] ([8]) galvanometer pointer does not      |
|pass first graduation on the dial, thus entailing:         |
|-100W power                                                |
|-SWR lower than or equal to 1.3                            |
------------------------------------------------------------
   |                    |     -------------------------------------
  YES                   |-NO-|Replace tuner unit [9] ([10]).        |
   |                          -------------------------------------
-----------------------               |       -------------------------
|Replace HF1 [1] (HF2 |               |-NOT OK-|Replace HF connector   |
|[2]) transceiver.    |                        |[13] ([14]).           |
-----------------------                        -------------------------
```

Chart 104

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[1] HF trans- ceiver		2-243	1R 1	Rear elec- tronics rack	23-11-33 R/I	23-11-01
[2] HF trans- ceiver		2-244	2R 1	Rear elec- tronics rack	23-11-33 R/I	23-11-01
[3] Circuit breaker 28 VDC		1-213	1R 3	Map Ref. L 18	24-50-00 R/I	23-11-01
[4] Circuit breaker 28 VDC		15-216	2R 3	Map Ref. F 13	24-50-00 R/I	23-11-01
[5] Circuit breaker 115 VAC		2-213	1R 4	Map Ref. H 19	24-50-00 R/I	23-11-01
[6] Circuit breaker 115 VAC		13-216	2R 4	Map Ref. G 7	24-50-00 R/I	23-11-01
R [7] HF selector unit		1-243	1R 8	Rear elec- tronics rack	23-11-45 R/I	23-11-01
R [8] HF selector unit		1-243	2R 8	Rear elec- tronics rack	23-11-45 R/I	23-11-01
[9] Tuner unit	321DR	321	1R 9	Fin - RH side	23-11-44 R/I	23-11-01
[10] Tuner unit	321ER	321	2R 9	Fin - RH side	23-11-44 R/I	23-11-01
[11] Co-axial relay		2-243	1R 6	Rear elec- tronics rack	23-11-47 R/I	23-11-01
[12] Co-axial relay		2-244	2R 6	Rear elec- tronics rack	23-11-47 R/I	23-11-01
[13] HF connec- tor	321FR	321	1R10	Fin - RH side	23-11-44 R/I	23-11-01

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[14] HF connector	321GR	321	2R10	Fin - RH side	23-11-44 R/I	23-11-01
R [15] HF dual control unit		9-211	R 2	Flt. Cpt	23-11-13 R/I	23-11-01
R [16] Captain's audio selector panel		7-211	R53	Flt. Cpt	23-41-21 R/I	23-11-01
R [17] First Officer's audio selector panel		7-211	R54	Flt. Cpt	23-41-21 R/I	23-11-01
R [18] Flight Engineer's audio selector panel		8-214	R56	Flt. Cpt	23-41-21 R/I	23-11-01
R [19] First Supernumerary's audio selector panel		7-213	R55	Flt. Cpt	23-41-21 R/I	23-11-01

Component Identification
Table 101

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	Aircraft Equipment

B. Prepare

(1) This test must be carried out with the aircraft outside and away from any building.

(2) Connect electrical ground power unit, and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(3) Operate the electronics rack ventilation (Ref. 21-21-00).

(4) On Captain's and First Officer's control column handwheels make certain that RAD-INT PTT switches are in the intermediate position :

(5) On Captain's audio selector panel, make certain that :

(a) R/T-INT PTT switch is in the intermediate position

(b) All keys on the control keyboard are disengaged

(c) All reception push-buttons are disengaged

(d) BOOM-MASK switch is in the BOOM position.

(6) On lower centre console 9-211, on HF control unit, make certain that OFF-AM-SSB function selector switches are in the OFF position.

(7) On LH console, on Captain's jack panel :

(a) Connect boomset to corresponding HEADSET and MIC jacks.

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(8) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No1 INPH SUP	1-213	R 89	K19
HF1 DC SUP		1R 3	L18
HF1 AC SUP	2-213	1R 4	H19
No2 INPH SUP	3-213	R 90	H 2
HF2 AC SUP	13-216	2R 4	G 7
CTR CONSOLE INST LTS	14-216	L405	B 8
HF2 DC SUP	15-216	2R 3	F13

C. Tests

NOTE : As both HF systems are identical, only test of HF1 system is described hereafter. For test of HF2 system, read numbers in brackets.

(1) Energizing of HF1 (HF2) System.

(a) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob clockwise then check on HF control unit, located on lower centre console 9-211, that :
- both frequency display windows are illuminated
- light brightness varies when knob is turned.

(b) On HF control unit, place OFF-AM-SSB function selector switch of HF1 (HF2) system in AM position. Allow the system to warm up for 2 minutes approximately before carrying out the following tests.

(2) Test of HF1 (HF2) transmission-reception.

CAUTION : BEFORE TRANSMITTING, MAKE CERTAIN THAT THE SELECTED FREQUENCY IS FREE AND OBSERVE THE RADIO REGULATIONS.

(a) On upper centre console 7-211, on Captain's audio selector panel.

(a1) Engage HF1 (HF2) key on control keyboard.

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(a2) Engage HF1 (HF2) reception push-button and adjust potentiometer integral with push-button to intermediate position.

(b) On lower centre console 9-211, on HF control unit HF1 (HF2) :

(b1) Select in frequency display window, the transmission frequency of a radio station and make certain that :
- during tuning sequence a 1000Hz signal is audible.
- When tuning is achieved, the background noise is audible again.

(b2) Turn RF SENS potentiometer clockwise and make certain that :
- Its action is progressive and causes no crackling.
- Adjust potentiometer to obtain satisfactory reception.

(c) On Captain's control column handwheel place and hold RAD-INT PTT switch in RAD position and speak into boomset microphone. Check that :

(c1) The message is heard in boomset earphones.

(c2) Transmission is correct.

(d) Release PTT switch and listen to radio station reply in boomset earphones. Check that reception is satisfactory.

D. Close-Up

(1) On HF control unit, place OFF-AM-SSB function selector switch of HF1 (HF2) system in OFF position.

(2) On Captain's audio selector panel :
- Disengage HF1 (HF2) key on keyboard.
- Disengage HF1 (HF2) reception push-button.

(3) On Captain's jack panel disconnect boomset.

(4) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

(5) Stop electronics rack ventilation (Ref. 21-21-00).

(6) De-energize the aircraft electrical network and dis-

connect electrical ground power unit (Ref. 24-41-00, Servicing).

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2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
5 Boomsets	Aircraft Equipment

B. Prepare

(1) This test must be carried out with the aircraft outside and away from any building.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Operate the electronics rack ventilation (Ref. 21-21-00).

(4) Place RAD-INT PTT switches in the intermediate position :

(a) On Captain's and First Officer's control column handwheels.

(b) On First Supernumerary's panel 3-213.

(c) On Second Supernumerary's panel 20-215.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels make certain that :

(a) R/T-INT PTT switch is in the intermediate position.

(b) All keys on the control keyboard are disengaged.

(c) All reception push-buttons are disengaged.

(d) BOOM-MASK switch is in the BOOM position.

(6) On Second Supernumerary's panel 20-215, place BOOM-MASK switch in BOOM position.

(7) On lower centre console 9-211, on HF control unit, make certain that OFF-AM-SSB function selector swit-

ches are in OFF position.

(8) On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels :

(a) Connect boomsets to HEADSET and MIC jacks.

(9) Make certain that the following circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HF1 DC SUP	1-213	1R 3	L18
No1 INPH SUP		R 89	K19
HF1 AC SUP	2-213	1R 4	H19
No2 INPH SUP	3-213	R 90	H 2
HF2 AC SUP	13-216	2R 4	G 7
CTR CONSOLE INST LTS SUP	14-216	L405	B 8
HF2 DC SUP	15-216	2R 3	F13

C. Tests

NOTE : As both HF systems are identical, only test of HF1 is described here after. For test of HF2 system read numbers in brackets.

(1) Energizing of HF1 (HF2) system.

(a) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL clockwise then check on HF control unit, located on lower centre console 9-211, that :
- Both frequency display windows are illuminated
- Light brightness varies when knob is turned.

(b) On HF control unit, place OFF-AM-SSB function selector switch of HF1 (HF2) system in AM or SSB position. Allow the system to warm up for 2 minutes approximately before carrying out the following tests.

(2) Test of HF1 (HF2) System in Receive Mode

(a) On upper centre console 7-211, on Captain's audio selector panel :

- Engage HF1 (HF2) reception push-button
- Turn its integral potentiometer clockwise, so as to obtain a medium audio level.

(b) On lower centre console 9-211, on HF control unit :

- place function selector switch of HF1 (HF2) system in AM position
- display the transmission frequency of a radio station in the HF1 (HF2) display window
- check that during the course of tuning (5 seconds approx.) a 1000 Hz signal is audible in boomset earphones and when tuning is achieved the background noise is audible again.

(c) During reception of station signals, check RF SENS potentiometer of HF1 (HF2) system located on HF control unit.

(d) On Captain's audio selector panel, turn the potentiometer integral with HF1 (HF2) reception push-button fully clockwise and then fully counter-clockwise. Check potentiometer operation and return to intermediate position.

(e) On First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, press HF1 (HF2) reception push-button. Make certain that :

- Turning the integral potentiometer clockwise and counterclockwise results in a progressive action without any crackling. Return potentiometer to intermediate position.

(3) Test of HF1 (HF2) System in Transmit Mode

CAUTION : BEFORE TRANSMITTING, MAKE CERTAIN THAT THE SELECTED FREQUENCY IS FREE AND OBSERVE THE RADIO REGULATIONS.

(a) On HF control unit, display the selected frequency for HF system in use.

(b) On Captain's (First Officer's) audio selector panel, engage HF1 (HF2) key on the keyboard.

(c) After a brief period of silence (first phase of

transceiver tuning), a 1000Hz signal is audible during the course of antenna tuning. This tuning is completely achieved when the 1000Hz signal ceases.

(d) After tuning, on Captain's (First Officer's) control column handwheel, place and hold RAD-INT PTT switch in RAD position and speak into boomset microphone. Check that :

- The message is heard in boomset earphones.
- Transmission is correct.

(e) Release Captain's control column handwheel PTT switch

(f) On HF control unit select a new frequency for HF system in use. Place and hold PTT switch on control column handwheel in the RAD position.

- check taht transmitting is not possible during tuning.

(g) Release control column handwheel PTT switch.

(h) On Flight Engineer's and First Supernumerary's audio selector panels, engage HF1 (HF2) key on keyboard.

(i) On each audio selector panel respectively, place and hold INT-R/T switch in R/T position.

- check that transmitting is possible.

NOTE : After use, each time return PTT switches to intermediate position.

(j) On First Supermerary's panel 3-213, place and hold RAD-INT PTT switch in RAD position.

- check that transmitting is possible and return PTT switch to intermediate position.

(k) On Second Supernumerary's panel 20-215, place and hold RAD-INT PTT switch in RAD position.

- check that transmitting is possible and return PTT switch to intermediate position.

NOTE : This operation is achieved through Flight Engineer's audio selector panel.

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(l) On HF control unit, place OFF-AM-SSB function selector switch of HF system in use (HF1 system) in SSB position.

(m) On Captain's (First Officer's) audio selector panel, place and hold INT-R/T PTT switch in R/T position. After positioning, establish contact with the selected radio station.

(n) After communication with the station :

- place INT-R/T PTT switch on Captain's (First Officer's) audio selector panel in the intermediate position.

(o) On Flight Engineer's and First Supernumerary's audio selector panels, disengage HF1 (HF2) keys on keyboard.

(4) Test of interlock circuit

(a) On HF control unit, place OFF-AM-SSB function selector switches of HF1 and HF2 systems in AM position.

(b) On Captain's audio selector panel, engage HF1 key on keyboard.

(c) On First Officer's audio selector panel, engage HF2 key on keyboard.

(d) On Captain's control column handwheel, place RAD-INT PTT switch in RAD position.

- HF1 transceiver is switched to transmit mode.

(e) On First Officer's control column handwheel, place RAD-INT PTT switch in RAD position :

- HF2 transceiver is not switched to transmit mode

(f) Release Captain's and First Officer's PTT switches

- HF1 transceiver no longer remains in transmit mode.

(g) On First Officer's control column handwheel, place and hold RAD-INT PTT switch in RAD position.

- HF2 transceiver is switched to transmit mode.

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(h) While holding First Officer's PTT switch in RAD position, place and hold Captain's PTT switch in RAD position.

- HF1 transceiver is not switched to transmit mode.

(i) Release Captain's and First Officer's PTT switches

D. Close-Up

(1) On HF control unit, place OFF-AM-SSB function selector switches in the OFF position.

(2) On Captain's audio selector panel :

- Disengage HF1 key on keyboard
- Disengage HF1 and HF2 reception push-buttons and turn their integral potentiometers fully counterclockwise

(3) On First Officer's audio selector panel :

- Disengage HF2 key on keyboard
- Disengage HF1 and HF2 reception push-buttons and turn their integral potentiometers fully counterclockwise.

(4) On Captain's First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels, disconnect boomsets from their respective jacks.

(5) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

(6) On Flight Engineer's and First Supernumerary's audio selector panels :

- Disengage HF1 and HF2 reception push-buttons, then turn their integral potentiometers fully counterclockwise.

(7) Stop electronics rack ventilation (Ref. 21-21-00).

(8) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

3. System Test

A. Equipment and Materials

Refer to paragraph 2. A of Functional Test

B. Prepare

(1) Carry out operations described in paragraph 2. B of Functional Test.

(2) Remove panels 243 and 244GS allowing access to the shelves of rear electronics racks.

C. Tests

NOTE : As both HF systems are identical only test of HF1 system is described hereafter. For test of HF2 system read numbers in brackets.

(1) Energizing of HF1 (HF2) system

(a) Repeat operation described in 2. C. (1) (a) of Functional Test.

(b) On HF control unit, place OFF-AM-SSB function selector switch of HF1 (HF2) system in AM position and check :
- In rear electronics rack, on shelf 2-243 (2-244) that transceiver 1R1 (2R1) fan operates.

CAUTION : IF TRANSCEIVER FAN DOES NOT OPERATE, IMMEDIATELY RETURN FUNCTION SELECTOR SWITCH ON HF CONTROL UNIT TO OFF POSITION.

(c) Allow the system to warm up for 2 minutes before carrying out the following tests.

(d) On front panel of transceiver 1R1 (2R1), place selector switch (associated with galvanometer) in 130 V and 28 V position, then check :
- in both cases that galvanometer pointer deflects in red sector of the dial.

(e) On selector unit 1R8 (2R8) located on shelf 1-243, press green SA AIR push-button and check :
- on galvanometer of selector unit, that the pointer deflects in upper green sector.

(2) Test of HF1 (HF2) system in receive mode.

(a) Repeat operations described in paragraph 2. C (2) of Functional Test.

(3) Test of HF1 (HF2) system in transmit mode.

(a) Repeat operations 2. C (3) (a) to 2. C (3) (c) of Functional Test.

(b) After tuning, on Captain's (First Officer's) control column handwheel, place and hold RAD-INT PTT switch in RAD position :

(b1) In rear electronics rack, on shelf 2-243, (2-244) check that rotational speed of transceiver 1R1 (2R1) fan increases immediately.

CAUTION : IF TRANSCEIVER FAN ROTATIONAL SPEED DOES NOT INCREASE DURING TRANSMISSION, IMMEDIATELY STOP TRANSMITTING

(b2) In rear electronic rack, on shelf 1-243, on galvanometer of selector unit 1R8 (2R8) check that the pointer does not deflect further than the first graduation of the dial (i.e. SWR lower than or equal to 1.3 for a HF power of 100W approximately).

(b3) While holding PTT switch in RAD position, speak into boomset microphone and check that :
- the message is heard in boomset earphones
- transmission is correct

(c) Repeat operations 2.C (3) (e) to 2.C (3) (o) of Functional Test.

(4) Test of interlock circuit

(a) On HF control unit, place OFF-AM-SSB function selector switch of HF1 (HF2) system in AM position.

(b) On Captain's, audio selector panel, engage HF1 key on keyboard.

(c) On First Officer's audio selector panel, engage HF2 key on keyboard.

(d) On rear electronics racks, on shelves 2=243 and 2-244, on HF transceivers 1R1 and 2R1, place se-

lector switches in PA-MA position.

NOTE : The pointer of the galvanometer located on front panel of each transceiver will deflect when the selected system is switched to transmit mode.

(e) On Captain's control column handwheel, place and hold RAD-INT PTT switch in RAD position :
- HF1 transceiver is switched to transmit mode, the galvanometer pointer deflects and fan rotational speed micreases.

(f) On First Officer's control column handwheel, place and hold RAD-INT PTT switch in RAD position :
- HF2 transceiver is not switched to transmit mode despite an increase in fan rotational speed.

(g) Release RAD-INT PTT switches on Captain's and First Officer's control column handwheels. Check that :
- HF1 transceiver no longer remains in transmit mode.
- the fans of both HF transceivers return to normal speed.

(h) Place and hold RAD-INT PTT switch on First Officer's control column hanwheel in RAD position :

- HF2 transceiver is switched to transmit mode (galvanometer pointer deflects and fan rotational speed increases).

(i) While holding PTT switch on First Officer's control column handwheel in RAD position, place and hold PTT switch on Captain's control column handwheel in RAD position :
- HF1 transceiver is not switched to transmit mode, galvanometer pointer does not deflect despite an increase in fan rotational speed.
- HF2 transceiver remains in transmit mode, galvanometer pointer does not move and fan rotational speed remains high.

(j) On Captain's and First Officer's control column handwheels, place RAD-INT PTT switches in intermediate position :
- HF2 transceiver no longer remains in transmit mode, galvanometer pointer returns to zero.
- each HF transceiver fan returns to normal speed.

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D. Close-Up

(1) Repeat operations described in paragraph 2. D of Functional Test.

(2) In rear electronics racks, install access panels 243 and 244 GS.

HF CONTROL UNIT - REMOVAL/INSTALLATION

1. General

The dual HF control unit R2 is installed in the flight compartment, on lower centre console 9-211.

2. HF Control Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets	

B. Prepare

(1) On centre console 9-211, make certain that OFF-AM-SSB function selector switches of HF dual control unit are in OFF position.

(2) Trip, safety and tag the following circuit breaker located on panel 14-216 :
CTR CONSOLE INST LTS SUP (L405), map ref. B8.

(3) On roof panel 4-211, make certain that CENTRE CONSOLE PANEL selector switch is in OFF position.

C. Remove

(1) Carry out operations described in 23-00-00, paragraph 3.D.

D. Preparation of Replacement Component

(1) Carry out operations described in 23-00-00, paragraph 3.E.

E. Install

(1) Carry out operations described in 23-00-00, paragraph 3.F.

F. Close-Up

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(1) Remove safety clips and tags and reset circuit breaker tripped in paragraph 2.B.(2).

(2) Carry out operational test (Ref. 23-11-00, Adjustment/Test).

HF TRANSCEIVER - REMOVAL/INSTALLATION

1. General

Two HF transceivers are installed on the aircraft in aft electronics racks.
HF1 transceiver 1R1 is installed on shelf 2-243 of LH aft electronics rack.
HF2 transceiver 2R1 is installed on shelf 2-244 of RH aft electronics rack.

2. HF Transceivers

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets	

B. Prepare

(1) On lower centre console 9-211, in flight compartment, make certain that OFF-AM-SSB function selector switch of HF dual control unit is in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HF1 DC SUP	1-213	1R3	L18
HF1 AC SUP	2-213	1R4	H19
HF2 AC SUP	13-216	2R4	G 7
HF2 DC SUP	15-216	2R3	F13

(3) On aft electronics racks, remove :

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(a) Panel 243G3 giving access to shelf 2-243 (HF transceiver No.1).

(b) Panel 244GS giving access to shelf 2-244 (HF transceiver No.2).

NOTE : As both HF transceivers are identically installed, only one removal/installation is described.

C. Remove

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.D.

D. Preparation of Replacement Component

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.E.

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.F.

F. Close-Up

(1) Remove safety clips and tags and reset circuit breakers tripped in paragraph 2.B.(3).

(2) Carry out test of HF transceiver (Ref. 23-11-33, Adjustment/Test).

(3) On aft electronics racks, install panels 243GS or 244GS.

HF TRANSCEIVER - ADJUSTMENT/TEST

1. General

Adjustment/test of HF transceiver(s) will be carried out to check correct operation of the unit(s) after removal/installation.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Microphone	
1 Boomset	

B. Prepare

(1) Remove panel 243GS from LH aft electronics rack giving access to shelf 1-243 where HF selector units are installed.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Operate electronics racks ventilation (Ref. 21-21-00).

(4) On lower centre console 9-211, place OFF-AM-SSB function selector switch of HF dual control unit in AM position.

(5) On HF transceiver in aft electronics racks, make certain that :

(a) the cooling fan is operating.

CAUTION : IN CASE OF TRANSCEIVER COOLING FAN FAILURE, IMMEDIATLY PLACE FUNCTION SELECTOR SWITCH OF HF CONTROL UNIT IN OFF POSITION.

(b) on front face, connect boomset to PHONE jack and microphone to MIC jack.

C. Test

NOTE : HF tranceiver must be energized approx. 4mn before starting tests described below.

(1) On aft electronics rack, on HF transceiver concerned, make certain that sidetone is heard.

(2) On transceiver front panel, place selector switch in 130V then 28V positions. The galvanometer pointer deflects within the red sector.

(3) On transceiver front face, place selector switch in 1500V position.

(4) On front face of selector unit corresponding to HF transceiver in operation, press START and KEY push-buttons and check that :

(a) cooling fan speed has increased

(b) pointer of HF transceiver galvanometer deflects within the red sector

(c) tuning signal is heard in boomset

CAUTION : IF COOLING FAN SPEED HAS NOT INCREASED, IMMEDIATLY RELEASE KEY PUSH-BUTTON.

(5) On front face of HF transceiver in operation, place selector switch in PA-MA position.

(6) On front face of selector unit corresponding to HF transceiver in operation, press START and KEY push-buttons and check that :

(a) galvanometer pointer deflects according to voice level when speaking in microphone.

D. Close-Up

(1) On front face of HF transceiver, disconnect :

(a) microphone from Mic jack
(b) boomset from PHONE jack

(2) Install panel 243GS giving access to HF selector units on aft electronics rack.

(3) On lower centre console 9-211, place OFF-AM-SSB of HF control unit in OFF position.

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(4) Stop electronics racks ventilation (Ref. 21-21-00).

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

TUNER UNIT - SERVICING

R CAUTION : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00,
R SERVICING.

1. General

The tuner unit is a component of HF system which sets the notch into resonance and matches its impedance with transceiver input impedance. As HF system is a dual system, two pressurized tuner units (1R9 and 2R9) are installed on the aircraft in zone 321.

2. Inspection and Pressurization of Tuner Units

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Electrical Ground Power Unit	
1 Hydraulic Elevator with a Pod or an Access Platform, 6.67 m (21 ft. 11 in.)	
1 Dry Air Source with Regulating Valve and Pressure Gage (1 kg/cm2 maximum pressure)	

B. Prepare

(1) In zone 243, in rear electronics rack, remove panel 243GS to gain access to shelves.

(2) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
HF1 DC SUP	1-213	1R	3	L18
HF1 AC SUP	2-213	1R	4	H19
HF2 AC SUP	13-216	2R	4	G 7
HF2 DC SUP	15-216	2R	3	F13

(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(4) Operate electronics rack ventilation (Ref. 21-21-00).

C. Check Tuner Unit Pressurization

(1) On lower centre console 9-211, on HF dual control unit, place function selector switches of both HF1 and HF2 systems in AM position.

(2) In rear electronics rack, on shelf 1-243, press SA AIR push-button on each HF selector unit and check that galvanometer pointer deflects in green upper sector.

NOTE : Refer to paragraph 2.D. for the following cases :
- the pointer is in the middle of green sector : HF system remains operational but requires pressurization of tuner unit as soon as possible.
- the pointer is in red sector : HF system is failed and requires pressurization of tuner unit.

(3) On lower centre console 9-211, on HF dual control unit, place function selector switches of both HF1 and HF2 systems in OFF position.

(4) Carry out operations described in paragraphs 2.E.(3) to 2.E.(5).

R After SB 23-024 For A/C 001-007,

R (1) In rear electronics rack, on shelf 1-243, on each HF
R selector unit, check that FAULT PRESS magnetic indi-
R cator does not show a light colour (yellow or white)
R and if it is, remove tuner unit to check if it is
R correctly sealed.

R (2) On lower centre console 9-211, on HF dual control
R unit, place function selector switches of both HF1
R and HF2 systems in AM position.

R (3) On each selector unit

R (a) Press RESET PRESS push-button, FAULT PRESS
R magnetic indicator shows a dark colour (black).

R (b) Press AIR push-button and check that galvanome-

R ter pointer deflects in the green upper sector.
R If the pointer deflects in the center of the
R green sector, the HF system can be used but
R must be pressurized as soon as possible.
R (Ref. paragraph 2.D.)

R (4) On lower centre console 9-211, on HF dual control
R unit, place function selector switches of both HF1
R and HF2 systems in OFF position.

R (5) Carry out operations described in paragraphs 2.E.(3)
R to 2.E.(5).

D. Pressurize Tuner Unit (Ref. Fig. 301)

(1) On lower centre console 9-211, on HF dual control unit, place function selector switches of HF1 and HF2 systems in OFF position.

(2) Place hydraulic elevator or access platform to fin in order :

(a) To gain access to RH side of fin leading edge in zone 321.

(b) To clear elevon travel.

(3) Open access door 321DR (1) to gain access to tuner unit 1R9 (3) or access door 321ER (6) to gain access to tuner unit 2R9 (8).

(4) Remove plug of Schraeder valve (7) or (2).

(5) Connect air supply source to Schraeder valve.

(6) Open regulating valve (4) till pressure gage (5) reads 0.351 kg/cm2 (4.992 psi).

(7) Shut regulating valve (4).

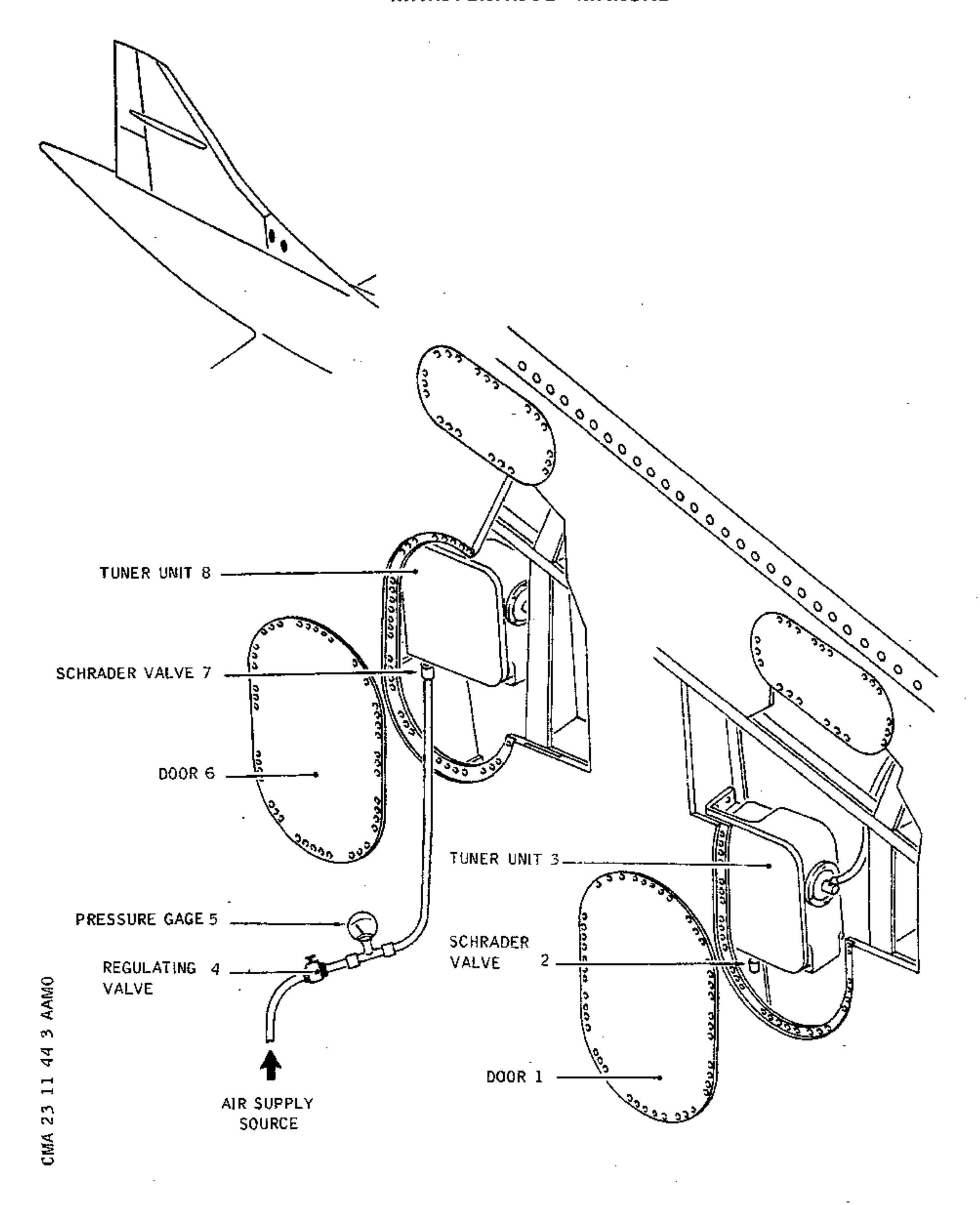
(8) Disconnect air supply source.

(9) Install and tighten plug on Schraeder valve (7) or (2).

(10) Repeat operations described in paragraph 2.C.(1) to 2.C.(3).

E. Close-Up

(1) Remove pressurizing equipment.



Tuner Unit : Pressurization
Figure 301

(2) Close access door 321DR (1) or 321ER (6).

(3) Remove hydraulic elevator or access platform.

(4) Stop electronics rack ventilation (Ref. 21-21-00).

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(6) In zone 243, install panel 243GS previously removed to gain access to shelves of rear electronics rack.

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TUNER UNIT - REMOVAL/INSTALLATION

1. General

Removal for replacement or check is identical for both tuner units, therefore, only removal of HF1 tuner unit (1R 9) is described. Removal of HF2 tuner unit is to be carried out following the same procedure and reading reference numbers between square brackets. Two types of tuner units of different dimensions except the width, may be installed on either HF system. The old type tuner units are in the form of parallelepipeds and will be called "type A". The new type tuner units which are higher but shorter will be called "type B".

CAUTION: INSTALLATION OF TYPE "B" TUNER UNIT AUTOMATICALLY INVOLVES INSTALLATION OF ITS MATCHING SELECTOR UNIT.

THOUGH THEY ARE NOT INDIVIDUALLY MATCHED, TYPE "A" TUNER UNIT CAN ONLY OPERATE WITH AN OLD TYPE SELECTOR UNIT.

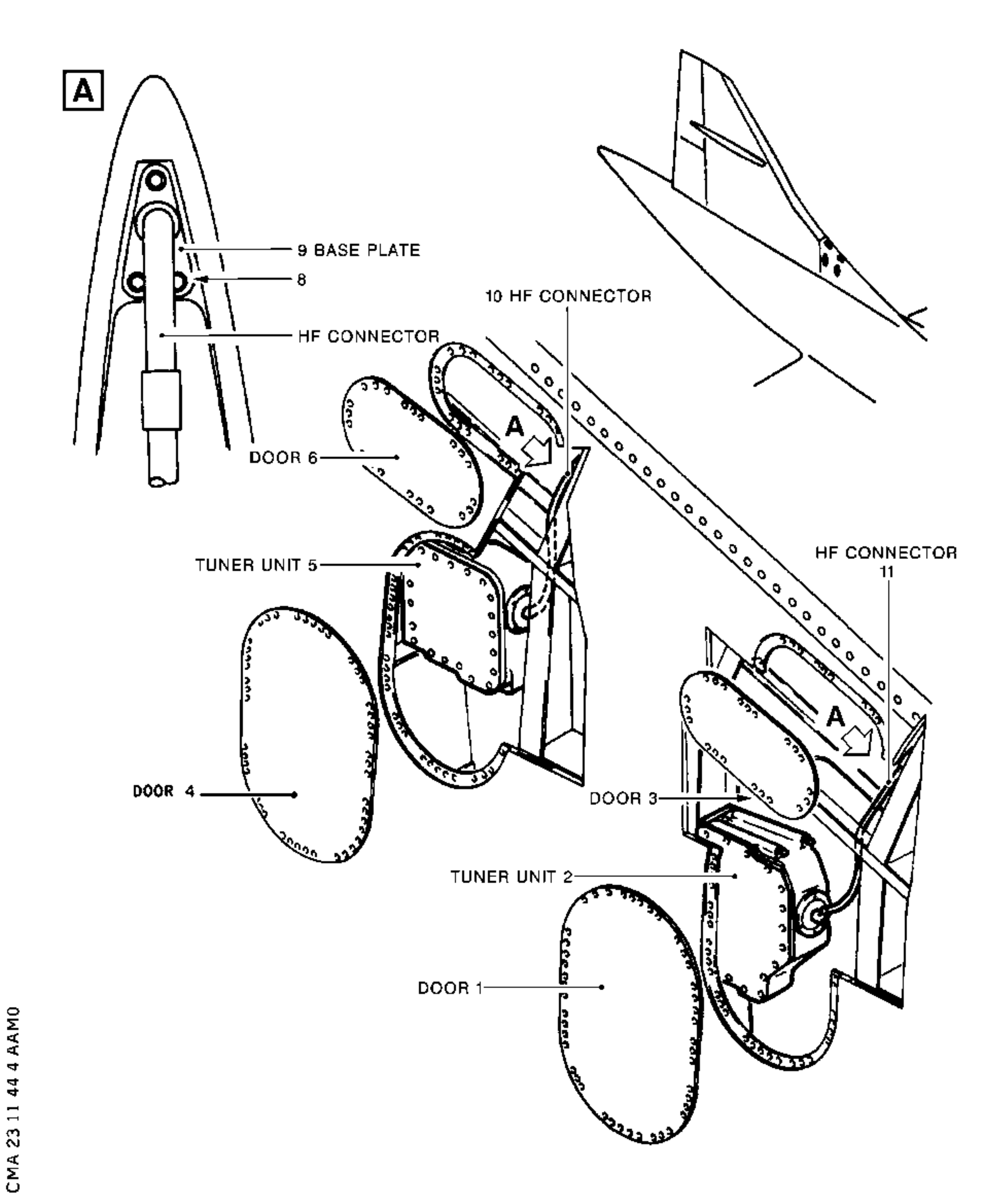
2. Tuner Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Hydraulic elevator with a pod or access platform to fin (6.67 m, (21 ft 11 in))	-
Circuit breaker safety clips	-
Thread sealing (Ref. 20-30-00, Product No. 351)	-
Dry air source with regulating valve and pressure gauge (1 kg/cm^2 (14.22 psi) maximum pressure) (Ref. 23-11-44, Servicing)	-

B. Prepare (Ref. Fig. 401)

(1) On lower centre console 9-211, make certain that OFF-AM-SSB function selector switches on the HF dual control unit are in OFF position.



Location of Tuner Unit and HF Connector
Figure 401

(2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER		MAP REF.
HF 1 DC SUP	1-213	1R	3	L18
HF 1 AC SUP	2-213	1R	4	H19
HF 2 AC SUP	13-216	2R	4	G 7
HF 2 DC SUP	15-216	2R	3	F13

(3) Place hydraulic elevator or access platform to fin in order:

(a) To gain access to the RH side of fin leading edge, in zone 321.

(b) To clear elevon travel.

(4) Open panels 321DR (1) and 321FR (3) [321ER (4) and 321GR (6)] to gain access to tuner unit 1R9 (2) [2R9 (5)].

C. Remove (Ref. Fig.401 and 402)

(1) Type A tuner unit (Ref. Fig. 402)

(a) On tuner unit 1R9 [2R9] (1), loosen, then remove lock screw (3) from end piece (4) of HF connector (5), maintaining the connector in order to avoid distortion.

(b) Disengage HF connector end-piece (4) from pin (2) of tuner unit (1).

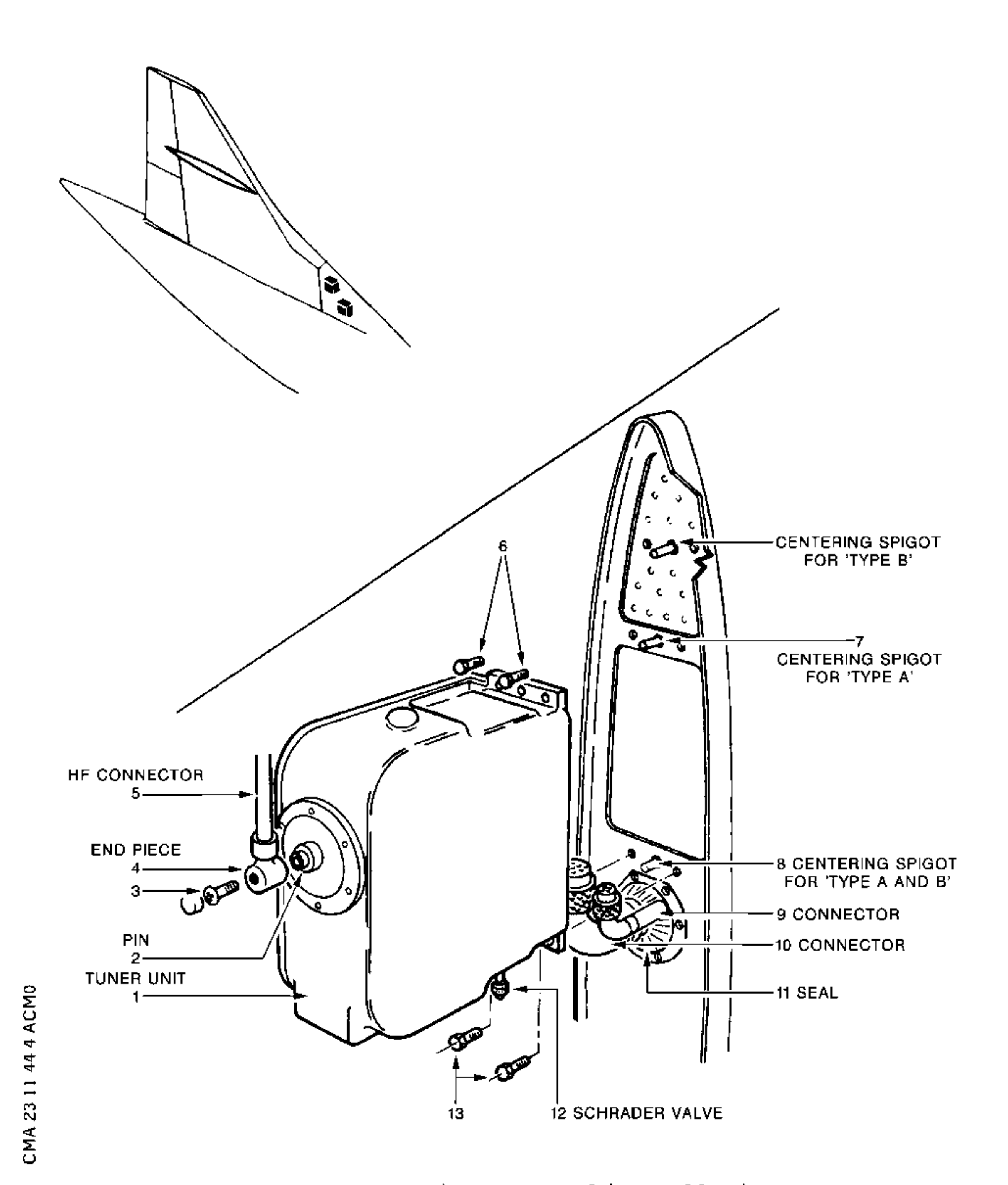
(c) Disconnect coaxial cables from connectors 1R9B [2R9B](9) and then 1R9A [2R9A] (10).

(d) Hold tuner unit (1) and remove bolts (6) and (13).

(e) Pull tuner unit (1) forward to clear centering spigots (7) and (8).

(f) Clean tuner unit interface.

(g) Check coaxial connectors (9) and (10) for correct condition.



Type A Tuner Unit : Removal/Installation
Figure 402

(h) Check that seal (11) is in position and in correct condition (upper housing, tuner unit 2R9 only).

NOTE: If type B tuner unit is to be installed, remove centering spigot (7) from structure and return to store with bolts (6) previously removed.

(2) Type B tuner unit (Ref. Fig. 403)

(a) On tuner unit 1R9 [2R9] (1), loosen, then remove lock screw (3) from end-piece (4) of HF connector (5), maintaining the connector in order to avoid distortion.

(b) Disengage HF connector end-piece (4) from pin (2) of tuner unit (1).

(c) Disconnect coaxial cables from connectors 1R9B [2R9B](9) and then 1R9A [2R9A](10).

(d) Remove the two screws (13), carefully hold tuner unit (1) and remove the two bolts (6).

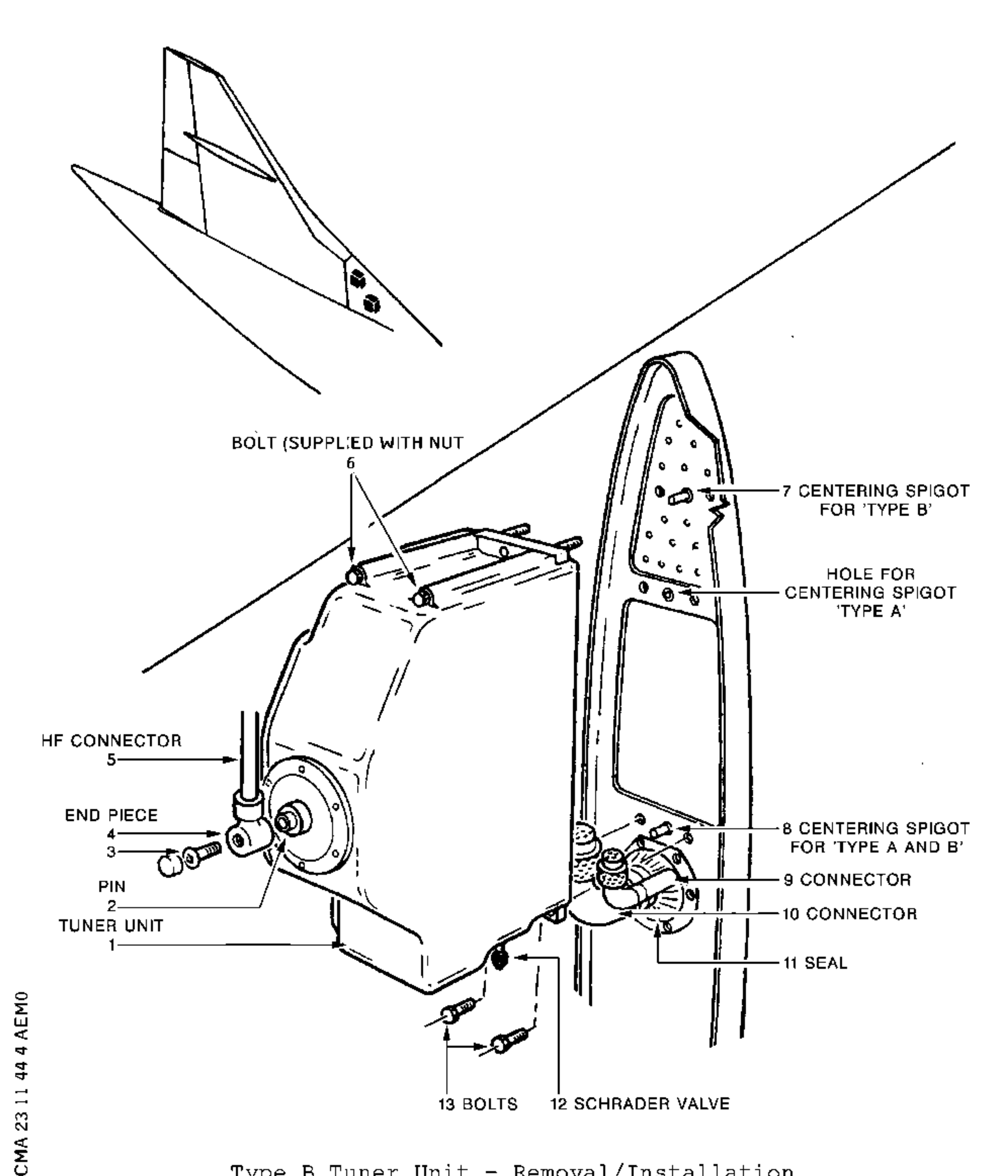
(e) Pull tuner unit (1) forward to clear centering spigots (7) and (8).

(f) Clean tuner unit interface.

(g) Check coaxial connectors (9) and (10) for correct condition.

(h) Check that seal (11) is in position and in correct condition (upper housing, tuner unit 2R9 only).

NOTE: If type A tuner unit is to be installed, depreserve centering spigot and the two bolts (6) previously stored. Coat threads of centering spigot with product No.351 and install on structure.

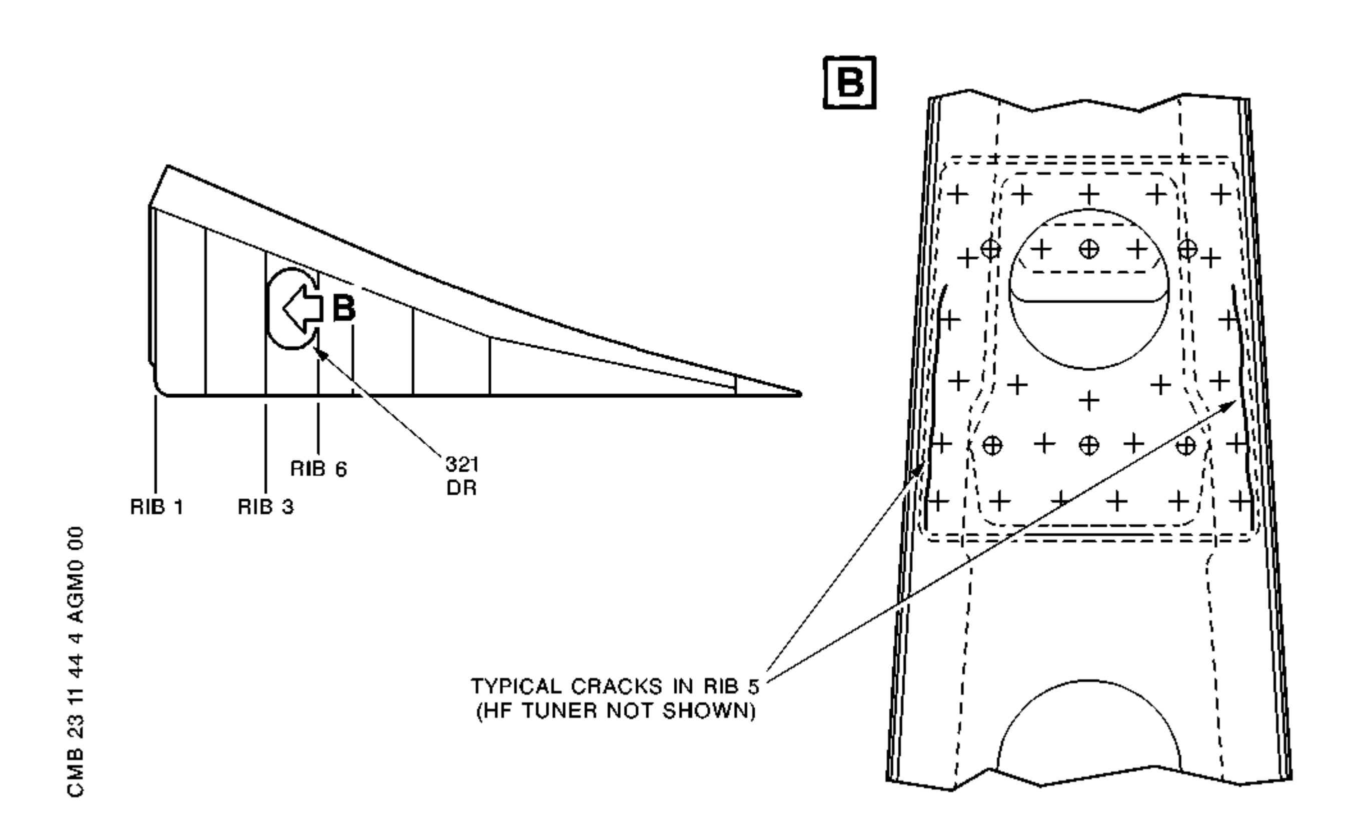


Type B Tuner Unit - Removal/Installation
Figure 403

RB D. Inspection (Ref. Fig. 404)

RB On removal of the ATU from both rib 1 (access via panel 321ER)
RB and rib 3 (access via panel 321DR) carry out a detailed visual
RB inspection of the location which is exposed by removal of the
RB unit.

RB NOTE: Some aircraft are repaired (Rib 3 Ref. RS 55-42147 and
RB Rib 1 Ref. RS 55-56726) and the visual inspection only
RB applies to the exposed areas of the repair and adjacent
RB structure.
RB In case of defects to unrepaired locations contact
Concorde core (see SB55-014 for defects to rib 3).



Rib Inspection
Figure 404

R
R E. HF Connector

(1) Visually check that HF connector is in correct condition and that base plate (9) is free from any corrosion and is correctly secured.

(2) In case of removal

(a) Remove HF connector (10) (11) attaching clamp(s).

(b) Hold HF connector, remove the three bolts (8) from base plate (9), then remove HF connector(s) (10) (11).

(c) Clean base plate interface.

(3) Install

(a) Position HF connector and secure base plate (9) by means of upper bolt (8) without tightening at this stage.

(b) Position HF connector correctly.

(c) Install the other two bolts (8) and tighten gently.

(d) Torque the three bolts (8) to 24 lbf in (0.270 mdaN).

(e) Install HF connector (10) (11) attaching clamp(s).

R F. Preparation of Replacement Component

(1) Visually check that the tuner unit is in correct condition and particularly that the coaxial connectors show no sign of corrosion.

(2) Check that the threads of pin (2) are in correct condition.

(3) Make certain that type B tuner units are also attached with bolts (6).

B (4) If a type B tuner is to be fitted to the No. 2 HF tuning
B unit position, check that bolts (6) protrude approximately
B 0.79 in (2 cm) from the machined surface of the tuner unit
B (1). If the bolts (6) protrude approximately 0.59 in
B (1.5 cm) replace with non-standard bolts (part number
B 4-95665).

R G. Install

(1) Type A tuner unit (Ref. Fig. 402)

(a) Make certain that centering spigot (7) is installed on structure.

(b) Position vertically tuner unit (1) and engage centering spigots (7) and (8) in their respective holes.

(c) Coat threads of bolts (6) and (13) with Product No.351.

(d) Engage bolts (6) and (13) and gently tighten, making certain that machined surface of tuner unit (1) makes correct contact with aircraft structure.

(e) Fully tighten bolts (6) and (13).

(f) Connect coaxial cable 1R9A [2R9A] (10) and coaxial cable 1R9B [2R9B](9).

(g) Engage HF connector end piece (4) with pin (2) of tuner unit (1).

(h) Tighten lock screw (3) on HF connector end piece (4).

(2) Type B tuner unit (Ref. Fig. 403).

B NOTE: A structural repair to the fin increases the
B thickness of the mounting member for the No. 2
B HF tuning unit. As a result of the repair, on
B type B tuner units with captive upper bolts,
B insufficient length of screw thread protrudes
B through the mounting member to securely hold the
B tuner unit. Thus non-standard captive bolts are
B required in the No. 2 position.

(a) Make certain that centering spigot specific to type A tuner unit is removed from aircraft structure.

(b) Coat threads of the two bolts (6) with Product No.351.

(c) Position vertically tuner unit (1) and engage centering spigots (7) and (8) in their respective holes.

(d) Install the two bolts (6) and tighten gently.

(e) Coat threads of the two bolts (13) with Product No.351 and install.

(f) Make certain that machined surface of tuner unit (1) makes correct contact with aircraft structure. Fully tighten bolts (6) and (13).

(g) Connect coaxial cables 1R9A [2R9A] (10) and coaxial cable 1R9B [2R9B] (9).

(h) Engage HF connector end piece (4) with pin (2) of tuner unit (1).

(j) Tighten lock screw (3) on HF connector end piece (4).

R H. Pressurize Tuner Unit

(1) Remove Shraeder valve (12) plug and connect air supply source to the valve.

(2) Open regulating valve until the pressure gauge reads 0.1351 kg/cm² (4.992 psi), then shut regulating valve and disconnect air supply source.

(3) Install and tighten Shraeder valve (12) plug.

R I. Test

(1) Remove safety clips and tags and reset circuit breakers previously tripped in para. 2.B.(2).

(2) In zone 243, in rear electronics rack, remove access panel 243GS.

(3) Test tuner unit (Ref. 23-11-44, Adjustment/Test).

R J. Close-Up

(1) In zone 243, in rear electronics rack, install access panel 243GS.

(2) Close doors 321DR (1) and 321FR (3), [321ER (4) and 321GR (6)].

(3) Remove pressurizing equipment.

(4) Remove hydraulic elevator or access platform.

R CAUTION : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00,
R SERVICING

1. General

This adjustment/test procedure must be performed after replacement of either type A or type B tuner unit.
As both tuner units are identical, only test of HF1 system tuner unit is described. For HF2 system read numbers between parentheses.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit 1 Boomset	Aircraft Equipment

B. Prepare

(1) Same preparation as for HF system operational test (Ref. 23-11-00, Adjustment/Test)

C. Test

(1) On lower centre console 9-211, on HF dual control unit, place HF1 (HF2) function selector switches in AM position.

(2) In rear electronics rack, on shelf 1-243, press SA AIR push-button on selector unit 1R8 (2R8) and check that galvanometer pointer deflects in green upper sector.

R After SB 23-024 For A/C 001-007,

R (2) In rear electronics rack, on selector unit 1R8 (2R8)
R press :

R (a) RESET PRESS magnetic indicator, FAULT PRESS
R magnetic indicator shows a dark colour (black).

R (b) AIR push-button and check that galvanometer
R pointer is in the upper green sector.

(3) On lower centre console, on HF dual control unit, select the frequency of a radio station with which communication is to be established.

(4) On upper centre console 7-211, on Captain's (First Officer's) audio selector panel
- engage HF1 (HF2) transmission key
- select HF1 (HF2) reception push-button and adjust integral potentiometer to intermediate position.

(5) Establish communication with the selected station in transmit/receive modes

D. Close-Up

(1) Same "Close-Up" as for HF system Operational Test (Ref. 23-11-00, Adjustment/Test)

HF SELECTOR UNIT - REMOVAL/INSTALLATION

1. General

Two HF selector units 1R8 and 2R8 are installed side by side in LH aft electronics rack on shelf 01-243.

2. HF Selector Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets	

B. Prepare

(1) On lower centre console 9-2H in flight compartment, make certain that OFF-AM-SSB function selector switches of HF dual control unit are in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HF1 DC SUP	1-213	1R3	L18
HF1 AC SUP	2-213	1R4	H19
HF2 AC SUP	13-216	2R4	G 7
HF2 DC SUP	15-216	2R3	F13

(3) On LH aft electronics rack, remove panel 243GS giving access to shelf 1-243.

NOTE : As both units are identically installed, only one removal/installation is described.

C. Remove

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.D.

D. Preparation of Replacement Component

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.E.

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.F.

F. Close-Up

(1) Remove safety clips and tags and reset circuit breakers tripped in paragraph 2.B.(2).

(2) Carry out test of selector unit (Ref. 23-11-33, Adjustment/Test).

R **ON A/C 001-005,

HF CONNECTOR - INSPECTION/CHECK

1. General

The HF connector is made up of two tubes connected together by metal bellows protected by a silicone rubber insulating sleeve. Following a power loss in HF system, the HF antenna tuning circuit was inspected and removal of the HF connector enabled to detect deterioration of the bellows.
The following inspection/check will then consist in making certain that the bellows of both HF connectors (1R10 and 2R10) in zone 321 are in good condition.

2. Inspect/Check

A. Equipment and Materials

DESCRIPTION	PART NO.
Hydraulic Elevator with a Pod or an Access Platform, 6.67 m (21 ft. 11 in.)	
Circuit Breaker Safety Clips	

B. Prepare

(1) On lower centre console 9-211, on HF dual control unit, make certain that function selector switches are in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HF1 DC SUP	1-213	1R 3	L18
HF1 AC SUP	2-213	1R 4	H19
HF2 AC SUP	13-216	2R 4	G 7
HF2 DC SUP	15-216	2R 3	F13

(3) Place hydraulic elevator or the access platform to fin in order :

(a) To gain access to the RH side of fin leading edge in zone 321.

(b) To clear elevon travel.

C. Inspect/Check (Ref. Fig. 601)

(1) Open doors 321DR(2) and 321FR(4) or 321ER(6) and 321GR (8).

(2) Disconnect HF connector (1) or (5) from tuner unit (3) or (7) and check that :

(a) it is not possible to rotate tube (9) in axial direction with respect to tube (12).

(b) there is no visible black spot between sleeve (10) and bellows (11).

NOTE : Failure of the bellows is not easy to detect because of the universal joint located inside the bellows and the insulating sleeve.

(3) Whenever the bellows are faulty, replace HF connector (Ref. 23-11-44, Removal/Installation, Paragraph 2. D.).

(4) Connect HF connector (1) or (5) to tuner unit (3) or (7).

(5) Install access doors 321DR(2) and 321FR(4) or 321FR(6) and 321GR(8).

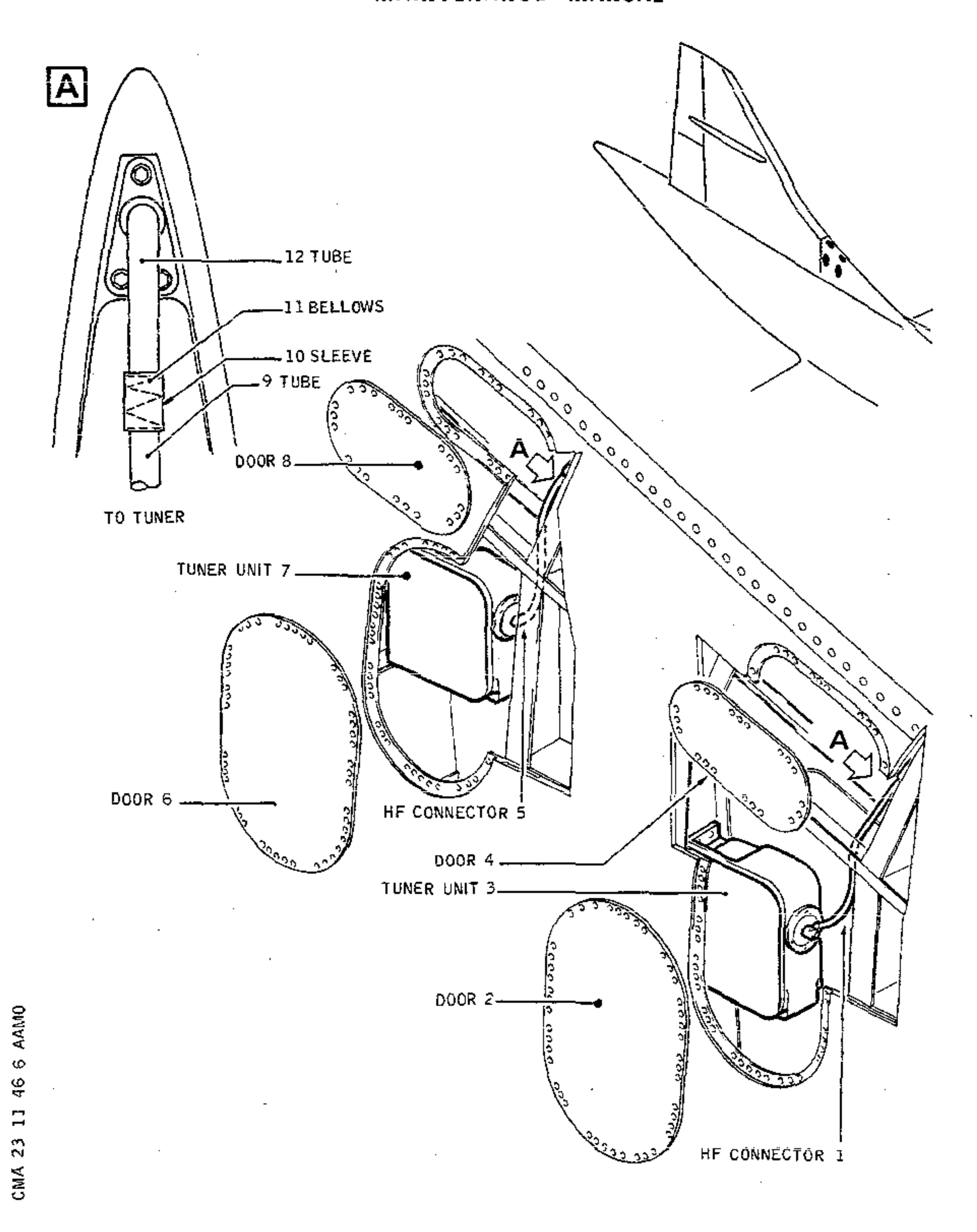
(6) Remove safety clips and tags and reset circuit breakers previously tripped in Paragraph 2. B. (2).

(7) Carry out an operational test (Ref. 23-11-00, Adjustment/Test).

D. Close-Up

(1) Remove hydraulic elevator or access platform.

Printed in England



HF Connectors - Location and Inspection/Check
Figure 601

HF COAXIAL RELAY REMOVAL/INSTALLATION

1. General

The HF coaxial relays are located in rear electronics racks 243 and 244 :
- coaxial relay 1R 6 is installed on RH side of HF transceiver 1R 1 on shelf 2-243
- coaxial relay 2R 6 is installed on LH side of HF transceiver 2R 1 on shelf 2-244.

Removal/installation procedures are identical for both coaxial relays.

2. HF Coaxial Relay

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

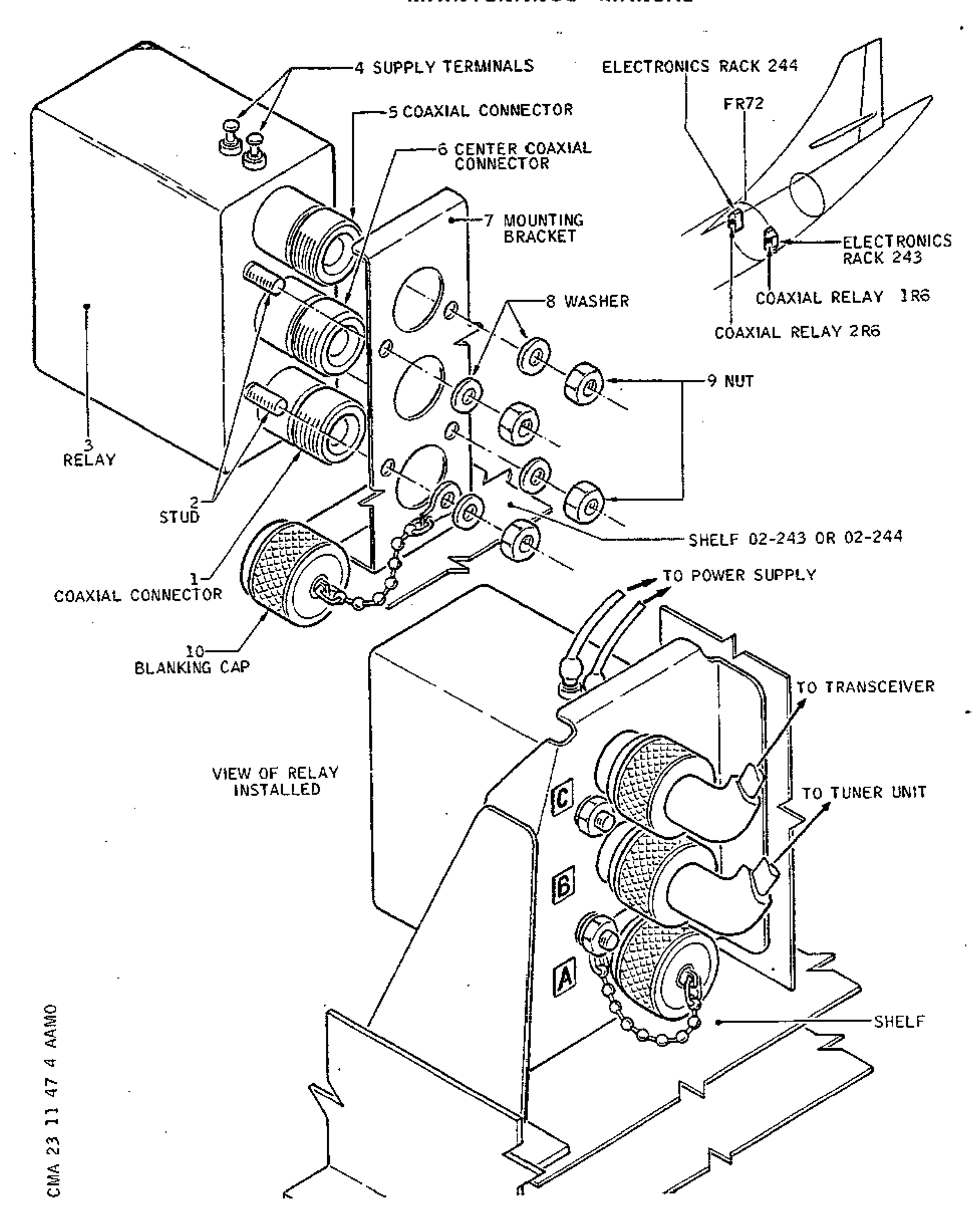
(1) On panel 9-211, make certain that OFF-AM-SSB function selector switches on HF dual control unit are in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HF 1 DC SUP	1-213	1R 3	L18
HF 1 AC SUP	2-213	1R 4	H19
HF 2 AC SUP	13-216	2R 4	G 7
HF 2 DC SUP	15-216	2R 3	F13

(3) Open door 243GS or 244GS to gain access to coaxial relay 1R 6 or 2R 6 on shelf 2-243 or 2-244

C. Remove (Ref. Fig. 401)



HF Coaxial Relay - Removal/Installation
Figure 401

(1) Disconnect HF transceiver coaxial cable connector from TRAVAIL coaxial connector (5)

(2) Disconnect tuner unit coaxial cable connector from center coaxial connector (6)

(3) Remove blanking cap (10) from REPOS coaxial connector (1)

(4) Identify and disconnect the wires from supply terminals (4)

(5) Loosen nuts (9) but do not remove them

(6) Remove nut (9) securing blanking cap chain. Retain washer (8), blanking cap (10) and associated chain

(7) Hold relay (3) and remove the other three nuts. Retain washers (8)

(8) Disengage relay (3) from mounting bracket (7) taking case not to damage :
- the threads of the three coaxial connectors and the threads of the four studs (2)
- the wiring at the rear of shelf

(9) Remove coaxial relay from the shelf

D. Preparation of Replacement Component

(1) Visually check that the coaxial relay is in correct condition and particularly that coaxial connectors and supply terminals show no signs of corrosion.

(2) On aircraft :

(a) Make certain that shelf and coaxial relay support bracket are clean.

(b) Make certain that tuner and transceiver coaxial cable connectors are in good condition.

(c) Make certain that relay coil supply wires are in good condition.

E. Install
(Ref. Fig. 401)

(1) Position coaxial relay on shelf.

(2) Engage relay (3) with mounting bracket (7), taking care

not to damage :
- the wiring at the rear of shelf
- the threads of the three coaxial connectors and the threads of the four studs (2)

(3) Hold relay and install one washer (8), one nut (9) on the two upper studs and on one of the lower studs. Do not fully tighten nuts.

(4) On the lower stud remaining free, attach blanking cap (10) chain with washer (8) and nut (9). Tighten nut.

(5) Tighten the three nuts previously installed

(6) Connect wires to supply terminals (4)

(7) Screw blanking cap (10) onto REPOS coaxial connector (1)

(8) Connect and tighten tuner unit coaxial cable connector to center coaxial connector (6)

(9) Connect and tighten HF transceiver coaxial cable connector to TRAVAIL coaxial connector (5)

F. Tests

(1) Remove safety clips and tags and reset the circuit breakers previously tripped in Paragraph 2 B (2)

(2) Carry out an operational test of the system (Ref. 23-11-00, Adjustment/Test)

G. Close-Up

(1) Close access door 243GS or 244GS on rear electronics racks.

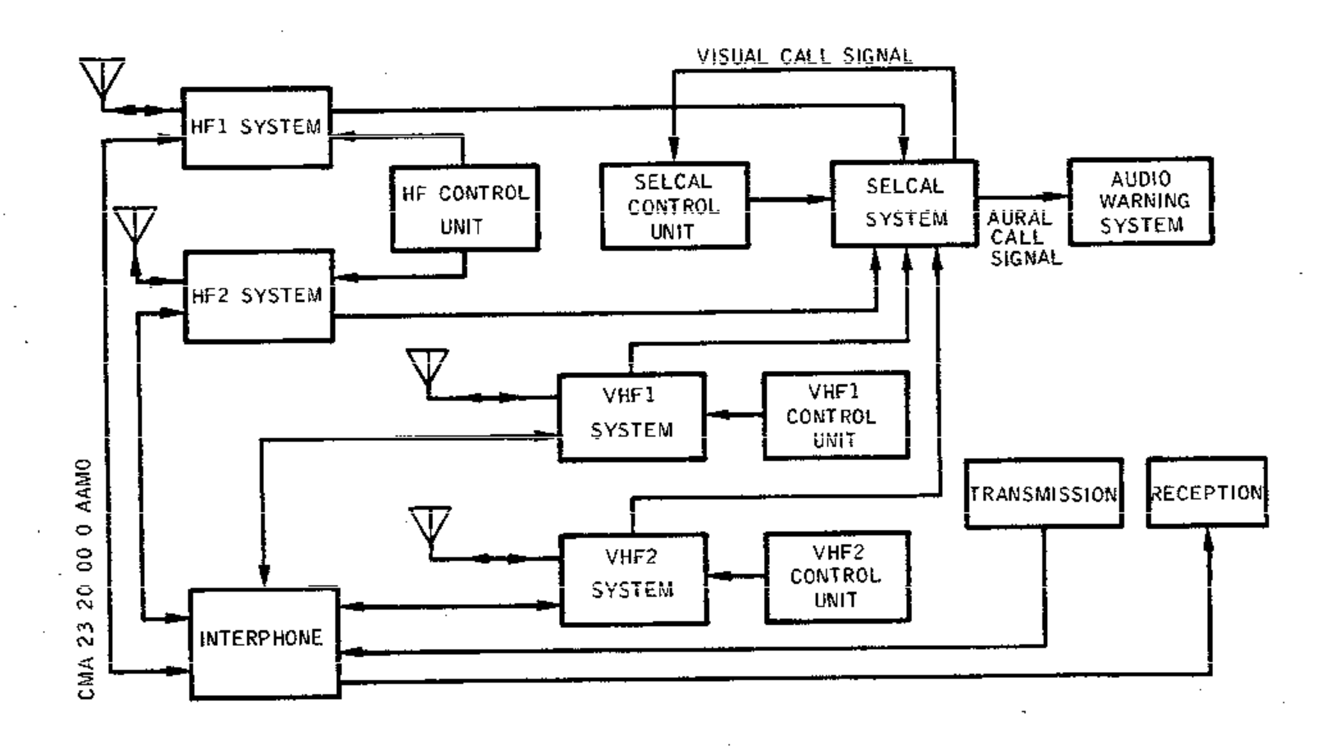
VERY HIGH FREQUENCY AND ULTRA-HIGH FREQUENCY (VHF/UHF)
DESCRIPTION AND OPERATION

1. General

This part of the communication system comprises :

- The VHF system
- The SELCAL system

2. Description and Operation (Ref. Fig. 001)



Very High Frequency - Block Diagram
Figure 001

A. VHF System

The VHF system provides voice communications between the aircraft and ground radio-stations, or between the aircraft and other aircraft, in the range of 118 to 136 Mhz.
The VHF system comprises two fully identical and independent installations and is connected to :

(1) The Selcal system, which gives notice of calls from ground radio stations.

(2) The interphone system, which allows the use of the VHF system, both in the receive mode and in the transmit mode.

(3) Not applicable

B. SELCAL System

The aircraft Selcal system provides aural and visual warning means, the purpose of which is to give notice to the Captain or to the First Officer that a ground radio station is wishing to establish communication with them.
This system therefore relieves the crew from permanent monitoring of the ground station transmission, which may concern any one of several aircraft in flight at the same time.
Each aircraft is assigned a specific code number and the ground station operator transmits the coded signal corresponding to the code number of the aircraft he wishes to establish communication with.
If the coded signal from the ground radio station corresponds to the aircraft code, the Selcal system energizes a visual warning on Selcal control unit and an aural warning in audio warning loudspeakers in flight compartment, thus informing the crew that the ground station transmission concerns them.
The Selcal system can be energized either by VHF or by HF transmissions ; the crew only have to select the installation to be used (HF1, VHF1, HF2, VHF2) on of the Selcal control unit.

VERY HIGH FREQUENCY (VHF) - DESCRIPTION AND OPERATION

1. General

This system comprises two identical installations which provide
RB voice communications in the 118 to 136.975 MHz band between the aircraft and other aircraft or ground radio-stations. It includes no interlock system, so that both installations can be
R independent.
Each installation is remote-controlled through its own control unit and through the various audio selector panels.
The VHF installations feed output signals to:

A. The SELCAL system, which gives the Captain or the First Officer notice that a ground radio-station is willing to establish communication with them.

B. The interphone system which provides the reception means.

C. Not Applicable.

2. System Components

The system comprises two VHF installations:

A. A VHF 1 installation:

- 1 transceiver 1R14
- 1 control unit 1R15
- 1 antenna 1R16

B. A VHF 2 installation:

- 1 transceiver 2R14
- 1 control unit 2R15
- 1 antenna 2R16

3. VHF Transceiver - KING KTR 9100 A

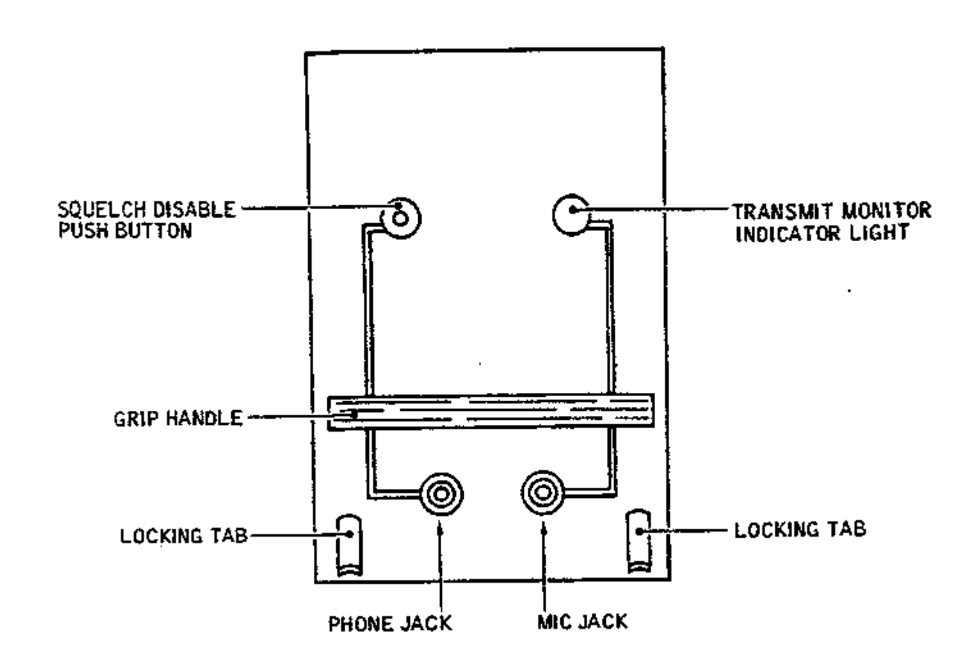
A. Description (Ref. Fig. 001)

(1) Mechanical characteristics

The transceiver takes the form of an ARINC standard 1/2 ATR short case weighing 13 lb (5.90 Kg).

(a) On the front panel are located:

- A grip handle
- Two locking tabs to attach the case to its



VHF Transceiver
Figure 001

base
- A TRANSMIT MONITOR indicator light, which illuminates when a modulation takes place, the transceiver being switched to transmit mode.
- A SQUELCH DISABLE push button, which inhibits operation of the squelch circuit when pressed
- A MIC jack, for direct modulation of the transceiver by means of a hand microphone
- A PHONE jack, which provides direct listening from the transceiver through a headset

(b) On the rear panel is an electrical receptacle which provides connection of the transceiver to the aircraft electrical network and to the various units related to its operation.

(2) Electrical characteristics

The transceiver is completely transistorized. It allows alternate operation in transmit and receive modes. The normal operating mode is the receive mode. Operation in transmit mode is obtained by pressing the push-

to-talk switches located either on the microphone, the control columns or on the audio selector panels:

(a) Transmit mode

RB

Frequency range	:	118 to 136.975 MHz
Channel spacing	:	25 KHz (compatible with a 50 KHz control unit)
Channel change-over time	:	50 Milliseconds approximately
Mode change-over time	:	50 Milliseconds approximately
Output power	:	25 Watts minimum
Output impedance	:	52 ohms

(b) Receive mode

Input impedance	:	52 ohms
Intermediate frequency (IF)	:	10 MHz
Audio-frequency output	:	Balanced around 100 mW with a 30% modulated signal and a load of 600 ohms.
SELCAL output	:	Variation of 6dB, from 300 10000 Hz

(c) Power supply

Supply voltage	:	+27.5 VDC
Current drawn	:	0.8 AMP in receive mode 8 AMP in transmit mode

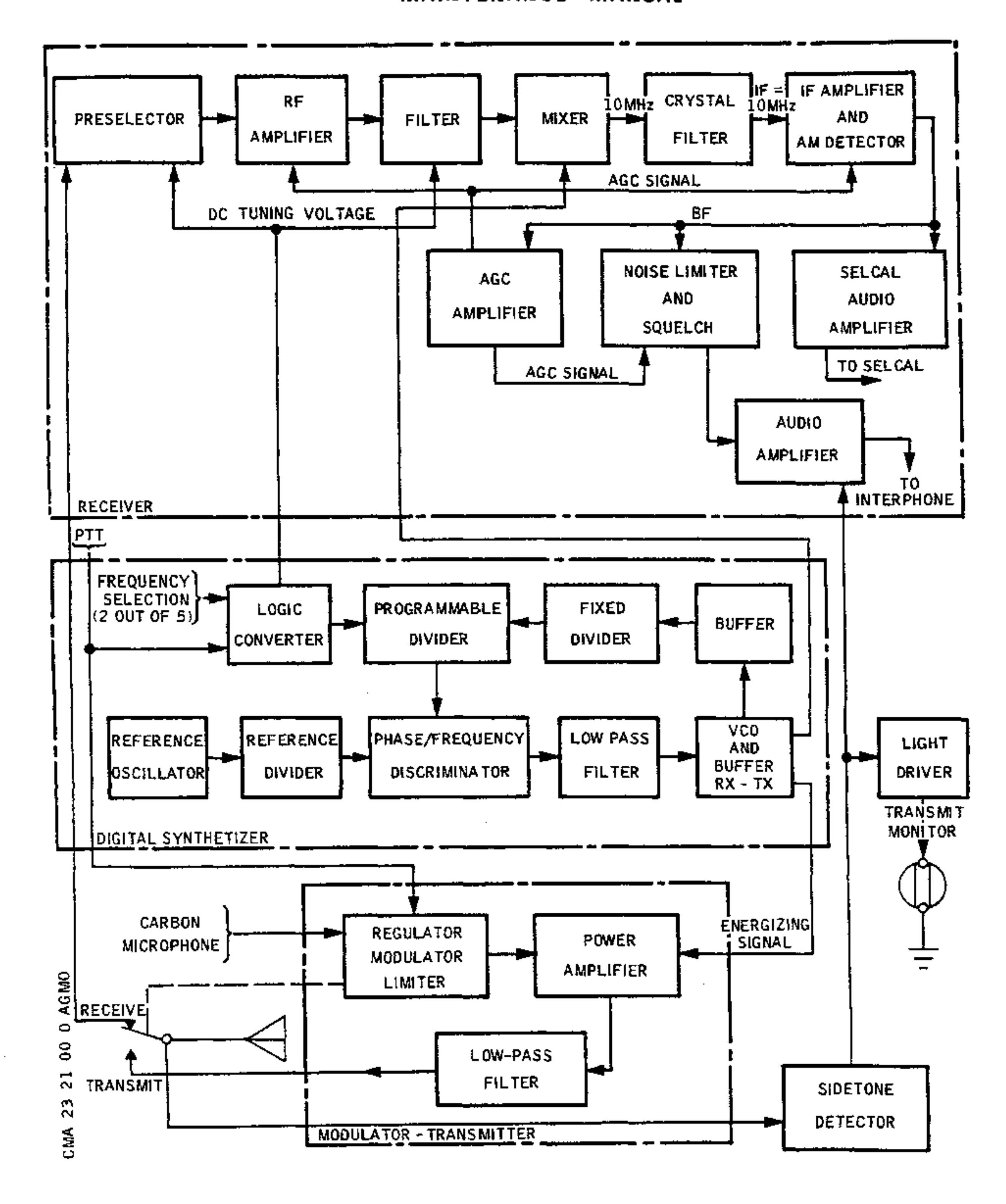
B. Operation (Ref. Fig. 002)

The transceiver comprises three parts:

- The digital synthesizer which feeds the DC tuning voltages to the receiver and to the transmitter as functions of the frequency selected on the control unit.
- The receiver which receives calls from ground radio stations or from other aircraft.
- The transmitter-modulator, which converts audio-frequency signal from a microphone into RF modulated signals.

(1) Digital synthesizer

The frequency signal corresponding to the frequency selected on the control unit, is applied, in a 2-out-



Transceiver - Schematic
Figure 002

of-5-code form, to the logic converter which converts it into :

- A BCD (Binary Coded Decimal) information signal fed to the Programmable divider.
- A tuning voltage for the receiver pre-selector
- A blocking signal which inhibits operation of the transmitter during the frequency change-over of the synthetizer.

The crystal controlled reference oscillator initiates a 12.8 MHz frequency, fed to the reference divider. The reference divider converts it into a 3.125 KHz frequency, supplied to the phase/frequency discriminator, which is also fed by the programmable divider output.

Both signals are compared within the discriminator, which issues a resulting DC voltage to the VCO (Voltage Controlled Oscillator) through the low-pass filter.
The discriminator is constantly monitored. It is supplied with :

- A signal from the VCO through the buffer, the fixed divider and the programmable divider.
- A signal from the reference oscillator through the reference divider.

The discriminator thus operates for given frequency and phase differences between the signals fed by the reference divider and the programmable divider respectively, so as to compensate for the error.
Through the RX-TX stage, the VCO feeds :

- An injection signal to the mixer
- An energizing signal to the power amplifier within its range of operation.

(a) Receive mode

In the absence of a transmission signal, the antenna relay connects the antenna to the preselector, which is fed, from the logic converter, with a selected signal of the same frequency as selected on the control unit.
From the VCO, the mixer is fed with a signal in the following manner :

- In the 118 to 129.975 MHz band, the VCO operates 10 MHz above the reception frequency, i.e.

from 128 to 139.975 MHz

RB - In the 130 to 136.975 MHz band, the VCO operates 10 MHz below the reception frequency,

RB i.e. from 120 to 126.975 MHz.

(b) Transmit mode

The PTT switch control connects the antenna to the receiver. The VCO feeds the power amplifier with the energizing signal, the frequency of which is the same

RB as selected on the control unit (118 to 136.975 MHz band).

(2) Receiver

The RF signal received by the antenna is fed to the pre-selector by means of the antenna relay, set to receive mode. The pre-selector is tuned to the frequency selected on the control unit by the logic converter. After being amplified, the RF signal is filtered and fed to the mixer, which is also supplied with the injection signal from the VCO. After mixing, the 10 MHz resulting signal is applied to the 10 MHz crystal filter which controls the pass band of the receiver. The 10 MHz filter feeds the four-stage IF amplifier, the second and third stages being fed back by the AGC, the final one applying the signal to the AM detector.

The detected audio-frequency signal is fed:

- To the SELCAL audio-frequency amplifier, which applies it to the SELCAL circuit.
- To the noise-limiter and squelch circuits.

The setting of the squelch circuit determines the squelch threshold; if the signal-to-noise ratio is not above the pre-set value, the audio-frequency signal is fed to the flight interphone through the power amplifier.

NOTE: The SELCAL signal does not undergo squelching action.

(3) Transmitter-Modulator

(a) Generation of the RF carrier

When the PTT switch is pressed, power is supplied to the transmitter-modulator and the antenna relay which then switches to the transmit mo-

de. The energizing signal from the VCO is fed to the power amplifier at the same frequency as selected on the control unit. The modulated RF signal is amplified and fed to the low-pass filter, the purpose of which is to considerably reduce the level of harmonics before applying the signal to the antenna.

(b) Modulation of the RF carrier

The audio-frequency signal from the microphone is applied to the regulator-modulator-limiter circuit, the purpose of which is to :

- Suppress transients
- Ensure line regulation
- Eliminate current ripple
- Modulate the signals fed to the power amplifier

Such a design avoids resorting to a modulation transformer, as in conventional modulators. After modulation has taken place, the modulator circuit feeds the power amplifier circuit which, through the low-pass filter, applies the modulated RF signal to the antenna.

The sidetone detector derives a voltage which is proportional to the power amplifier output. This voltage is used as a RF reference signal which triggers the TRANSMIT MONITOR indicator light circuit and energizes the audio frequency oscillator, thus providing a sidetone check through the interphone system.

4. Control unit - Gables G-3837

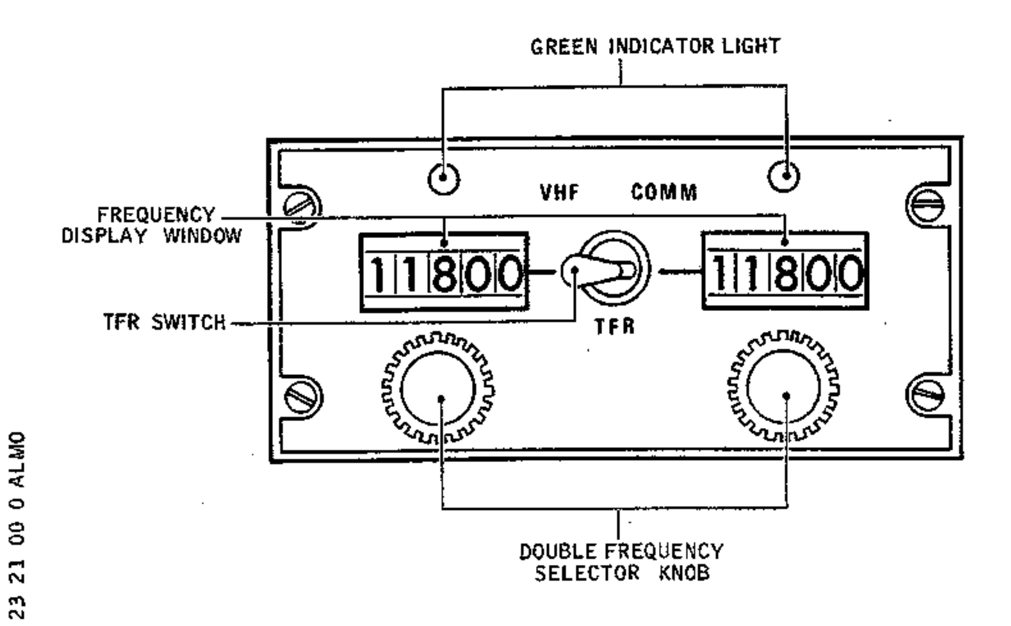
A. General

This control unit allows selection of the frequencies necessary to operate the VHF installations. Two distinct frequency values can be selected at the same time and checked through the display windows ; either one of the corresponding signals will be fed to the transceiver, according to the position of the transfer switch.

B. Description and Operation (Ref. Fig. 003)

(1) On the front panel are located :

(a) Two indicator lights



VHF Control unit
Figure 003

Two green indicator lights, located above the frequency display windows indicate the display window in use, They are power-supplied by a + 28 VDC voltage and controlled by the TFR transfer switch.

(b) Two frequency display windows

Two digital frequency indicators fitted behind windows, allow to check the frequency value corresponding to the frequency selected by means of the selector knobs.

(c) A TFR transfer switch

Located between both frequency display windows, the switch provides alternate operation of either one of the windows. Its role is to switch the frequency selection common line to LH or RH display window, thus illuminating green indicator light associated with window in use.

(d) Two double knurled frequency selector knobs

These knobs are fitted below the frequency display windows ; the LH knob allows to select frequency in LH frequency display window ; the RH knob allows to select frequency in RH display window.
Frequency display is otained by means of :

- The inner knob for hundredths and tenths of MHz
- The outer knob for units and tens of MHz

The frequency selection circuit operates from a two-out-of-five code, i.e. with a set of five conductors for each figure of the frequency value number, two out of the five conductors corresponding to a given figure being connected to the ground ; channel spacing is 25 KHz.

(2) On the rear panel is an electrical receptacle for connection of the control unit to the aircraft electrical network.

R 5. Antenna : - Sud Aviation ACHF 102 - Chelton 19-181
R (Ref CM 42035)
R (Ref. Fig. 004)

This antenna is a trapezoidal assembly consisting of two metal shells. A fibreglass wedge, installed in the trailing edge cut-out, contains the VHF energizing unit. The antenna is located at the upper section of the fuselage.

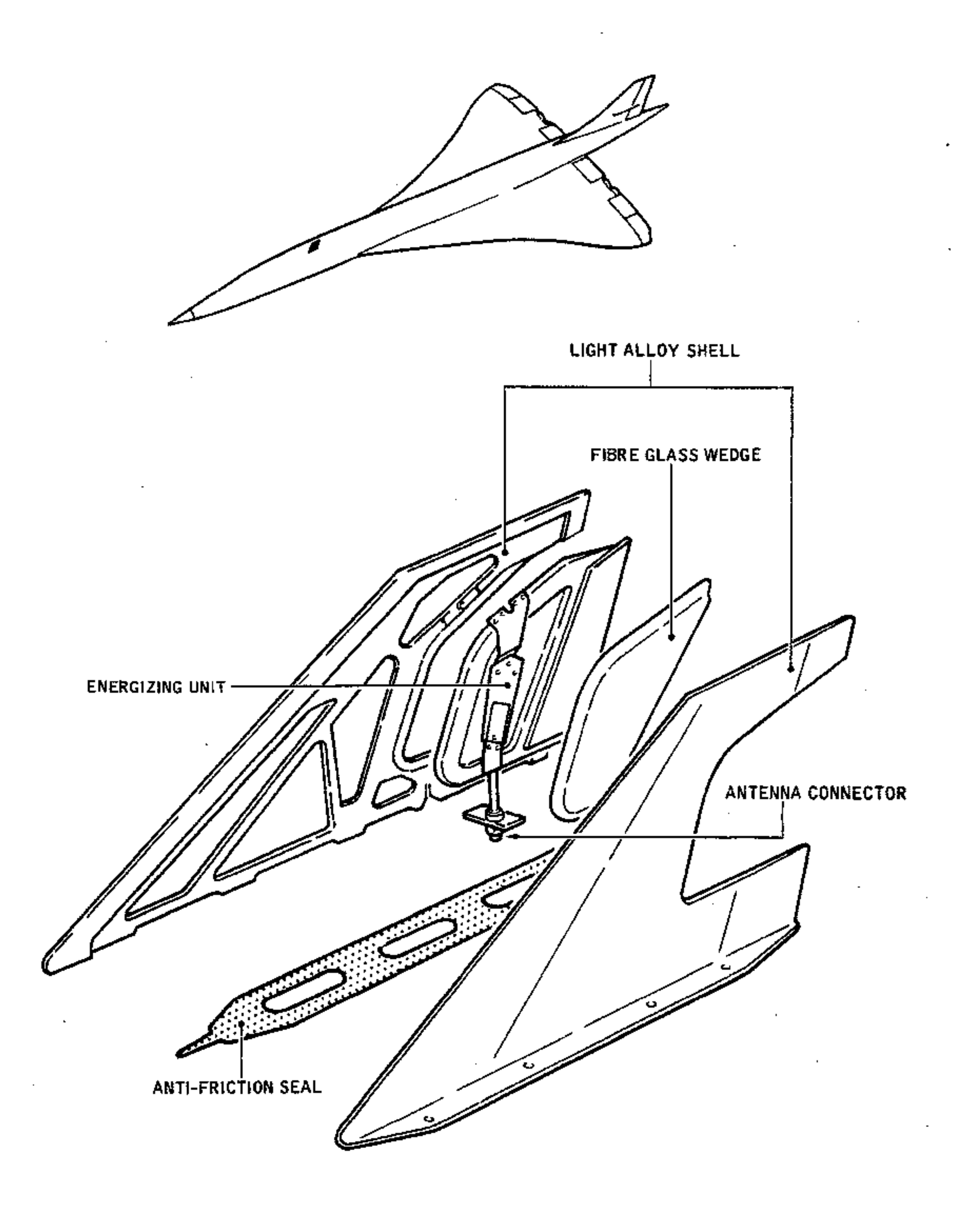
The energizing unit comprises a printed circuit and two brass blades. The upper blade allows to attach the unit to the metal part and the lower blade allows to connect the printed circuit to the connector, by means of a rigid co-axial line.

The antenna operates as a ground-connected antenna. It is energized through a shunt via a matching circuit and then is connected to transceiver by means of a co-axial cable.

The antenna operates in the 118 to 136 MHz band, with a vertical polarization and a permissible output power of 50 Watts. Its impedance is 50 ohms and its SWR lower than or equal to 2.

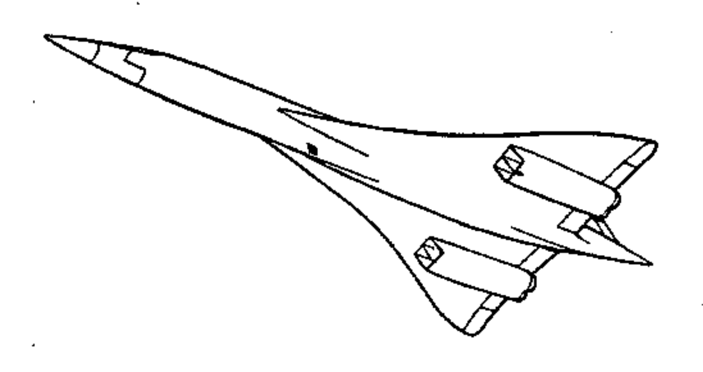
R 6. Antenna : - Sud Aviation ACGL 102 - Chelton 19-180
R (Ref CM 42034).
R (Ref. Fig. 005)

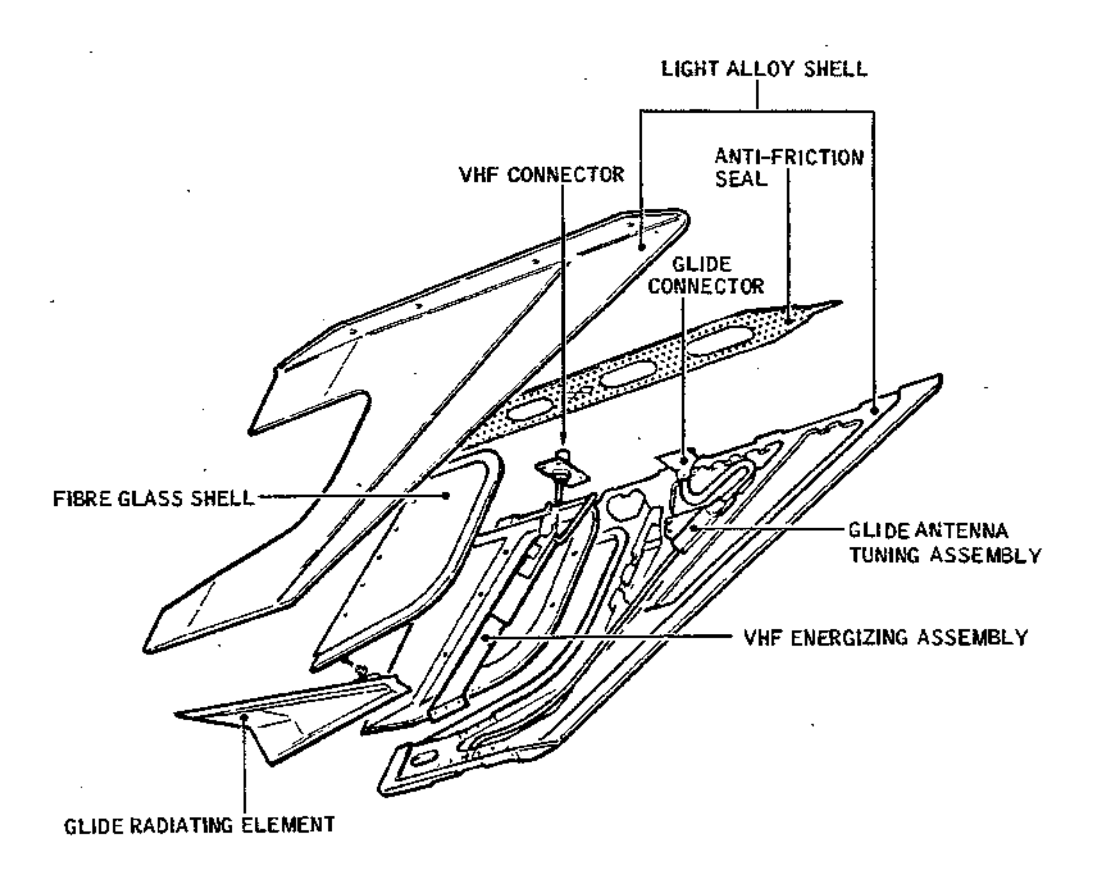
This antenna is common to the VHF transceiver and to the glide



R

VHF1 Antenna
Figure 004





R

VHF2/Glide Antenna
Figure 005

receiver. It consists of two parts, which are electrically distinct but attached to the same mount.
It takes the form of a profiled trapezoid-shaped assembly, made of two metal shells. A fibreglass wedge, installed in the trailing edge cut-out, contains the energizing unit of the VHF sensitive section of the antenna.

The energizing unit comprises two circuits :

- The actual energizing circuit consisting of a plane capacitor, the upper blade of which is attached to the upper part of the metal shell, the lower blade being connected to the connector, by means of a rigid co-axial line.
- The matching circuit, in parallel with the energizing circuit, comprises a coil and a small plane capacitor.

This antenna is located at the lower part of the fuselage ; it operates in the 118 to 136 MHz band, with a vertical polarization and a permissible output power of 50 Watts. Its impedance is 50 ohms, with an SWR lower than or equal to 2.

7. Operation
(Ref. Fig. 006)

A. Energizing

When VHF1 or VHF2 system circuit breaker is set, a +28VDC voltage is applied to the VHF control unit and to the associated transceiver.

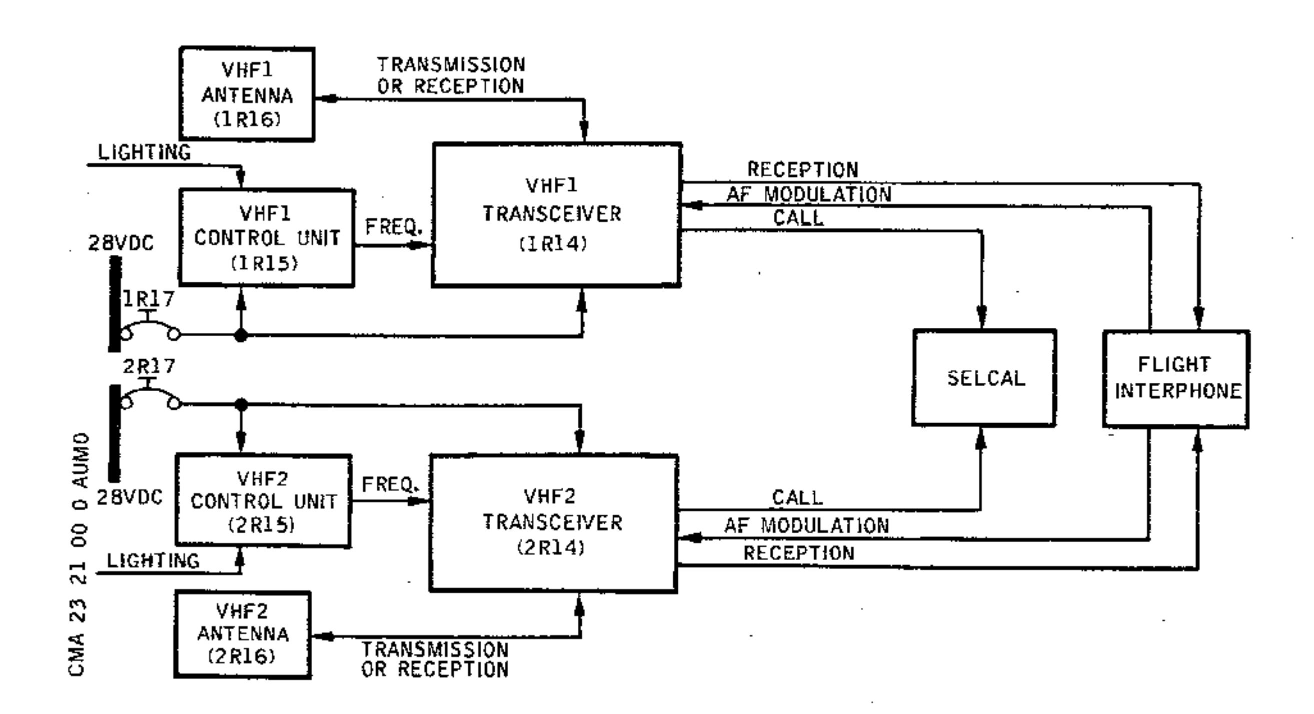
B. Transmit Mode-Receive Mode

(1) Transmit Mode

With a selected frequency displayed on VHF control unit and the VHF 1 and VHF 2 transmit mode being selected on audio selector panel, modulation takes place from a microphone by operating the corresponding push-to-talk switch. The audio-frequency signal from the microphone is amplified and then applied to the input of the transceiver (1R14 or 1R15) which converts it into a modulated RF signal fed to the antenna. A sidetone output is fed to the interphone system.

(2) Receive Mode

As the push-to-talk switch is released, the transceiver is switched to receive mode, which allows the modulated RF signal received by the antenna to be fed to the transceiver. After demodulation of the RF signal, the remaining audio-frequency signal is fed to the inter-



VHF System - Block Diagram
Figure 006

phone system via the audio selector panel set to receive mode, thus enabling reception in loudspeakers and boomsets.

C. Output to Selcal Decoder

When a ground radio-station calls the aircraft, the signal received by the antenna of the VHF installation in use is applied to the corresponding transceiver, when set to receive mode. The signal is then demodulated and fed to the Selcal decoder, which, by means of an indicator light and an aural warning system, gives notice to the crew that a ground radio-station wants to establish communication with them.

VERY HIGH FREQUENCY (VHF) - TROUBLE SHOOTING

WARNING : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the VHF system to be quickly rectified.

The defect can be isolated with the aid of trouble shooting procedures (Ref. Para 3), and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.

Bracketed numbers in the procedures and charts indicate items on the Component Identification Table (Ref. Table 101). The table provides information, including component location, required for rectification.

All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available, unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

As the two VHF systems are identical, trouble shooting procedures are described for system 1. For system 2, refer to numbers between parenthesis.

2. Prepare

R A. In zones 215 and 216 remove panels 215ES and 216ES giving
R access to shelves in forward electronics racks.

B. Make certain that all PTT switches are in intermediate position.

C. On Captain's (1st Officer's) jack panel connect a boomset to BOOM SET jacks.

D. On audio selector panels make certain that :

(1) All the keys on keyboard are disengaged.

(2) All the reception push-buttons are disengaged.

(3) BOOM-MASK switch is in BOOM position.

E. Make certain that all the circuit breakers associated with VHF system are reset (Ref. 23-21-00, Adjustment/Test).

F. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

G. Activate electronics racks ventilation (Ref. 21-21-00).

H. On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob clockwise and check that frequency display windows on VHF1 and VHF2 control units on lower centre console 9-211 are illuminated.

I. On upper centre console 7-211, on Captain's (1st Officer's) audio selector panel, engage push-button VHF1 (VHF2) then place the integral potentiometer in intermediate position to obtain a medium audio level.

3. Trouble Shooting

```
*****************************************************
* On lower centre console 9-211, on VHF control unit *
* [1] ([2]), check that green indicator light        *
* located above LH or RH frequency display window is *
* illuminated :                                      *
* - TFR switch to left  : LH light illuminates.      *
* - TFR switch to right : RH light illuminates.      *
* If :                                               *
*****************************************************
    ||   |       ----------------------------------------------------
    OK   |-NOT OK--| Green indicator light showing system in service|
    ||             | not illuminated - Ref. Chart 101.               |
    ||             ----------------------------------------------------
*****************************************************
* Background noise is heard in boomset earphones.    *
* If :                                               *
*****************************************************
    ||   |       ----------------------------------------------------
    OK   |-NOT OK--| Background noise not heard - Ref. Chart 102     |
    ||             ----------------------------------------------------
*****************************************************
* On upper centre console 7-211, on Captain's [9]    *
* (1st Officer's [10] audio selector panel, engage   *
* VHF1 (VHF2) key on keyboard.                       *
* On Captain's (1st Officer's) control column, place *
* and hold RAD-INT PTT switch in RAD position and    *
* speak into boomset microphone : Voice is heard in  *
* boomset earphones. If :                            *
*****************************************************
    ||   |       ----------------------------------------------------
    OK   |-NOT OK--| No sidetone - Ref. Chart 103.                   |
    ||             ----------------------------------------------------
*****************************************************
* On lower centre console 9-211, on VHF control unit *
* [1] ([2]), select frequency of desired station.    *
* Place and hold Captain's (1st Officer's) PTT       *
* switch in RAD position, then speak into boomset    *
* microphone. Establish contact with station. If :   *
*****************************************************
    ||   |       ----------------------------------------------------
    OK   |-NOT OK--| No sidetone - Ref. Chart 103.                   |
    ||             ----------------------------------------------------
*****************************************************
* On lower centre console 9-211, on VHF control unit *
* [1] ([2]), select frequency of desired station.    *
* Place and hold Captain's (1st Officer's) PTT       *
* switch in RAD position, then speak into boomset    *
* microphone. Establish contact with station. If :   *
*****************************************************
```

```
    ||  |       -------------------------------------------------
    OK  |-NOT OK--| Check transmission - Ref. Chart 104.        |
    ||          -------------------------------------------------
*******************************************************
* VHF system is operational.                          *
*******************************************************
```


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```
*************************************-----------------------------------
* GREEN INDICATOR LIGHT SHOWING     *| GROUND EQUIPMENT REQUIRED        |
* SYSTEM IN SERVICE NOT ILLUMINATED *-----------------------------------
*************************************|  DESCRIPTION          PART NO.  |
                                     -----------------------------------
                                     | MULTIMETER                       |
                                     -----------------------------------

*****************************************************
* On lower centre console 9-211, on VHF control unit *
* [1] ([2]), place TFR switch in other position :    *
* corresponding indicator light illuminates.         *
*****************************************************
     |   |
     |   |
     |   |
     |   |           ------------------------------------------------------
     NO  |-YES-----| Replace VHF control unit [1] ([2]).                  |
     |               ------------------------------------------------------
     |
     |
     |
*****************************************************
* Check 28 VDC output from circuit breakers [3]      *
* ([4]).                                             *
*****************************************************
     |   |
     |   |
     |   |
     |   |           ------------------------------------------------------
     NO  |-YES-----| Replace VHF control unit [1] ([2]).                  |
     |               ------------------------------------------------------
     |
     |
     |
*****************************************************
* Replace circuit breaker [3] ([4]).                 *
*****************************************************
```

Chart 101

```
***************************************-------------------------------
* BACKGROUND NOISE NOT HEARD          *| GROUND EQUIPMENT REQUIRED   |
***************************************-------------------------------
                                       | DESCRIPTION       PART NO.  |
                                       -------------------------------
                                       | HEADSET                     |
                                       -------------------------------

*****************************************************
* Reception at Captain's [9] (1st Officer's [10])   *
* audio selector panel. Repeat test at other        *
* audio selector panel [9, 10, 11 or 12]: background *
* noise is heard in boomset earphones.              *
*****************************************************
    |    |
    |    |
    |    |
    |    |    ----------------------------------------------------
    NO   |-YES-----| Replace defective audio selector panel [9, 10, |
    |              | 11 or 12].                                     |
    |              ----------------------------------------------------
    |
    |
*****************************************************
* In forward electronics racks, on shelf 3-215      *
* (5-216), connect a headset to PHONE jack on front  *
* panel of VHF transceiver [5] ([6]) : background   *
* noise is heard in headset.                        *
*****************************************************
    |    |
    |    |
    |    |
    |    |    ----------------------------------------------------
    NO   |-YES-----| Ref. 23-41-00, Trouble Shooting.              |
    |              ----------------------------------------------------
    |
    |
*****************************************************
* Replace VHF transceiver [5] ([6]).                *
*****************************************************
```

Chart 102

NO SIDETONE

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
HAND MICROPHONE	
HEADSET	

Modulation and reception at Captain's [9] (1st Officer's [10] audio selector panel. Repeat test at other audio selector panel [9, 10, 11 or 12]: Sidetone is heard.

- YES — Replace defective audio selector panel [9, 10, 11 or 12].
- NO — In forward electronics racks, on shelf 3-215, (5-216), on front panel of VHF transceiver [5] ([6])
  - connect a hand microphone to MIC jack.
  - connect a handset to PHONE jack.

  Press PTT switch on hand microphone and speak into microphone. Check that voice is heard in headset and that TRANSIT MONITOR indicator light illuminates.
  - YES — Ref. 23-41-00, Trouble Shooting
  - NO — Replace VHF transceiver [5] ([6]).

Chart 103

```
**************************************-------------------------------
* TRANSMISSION CHECK.                *| GROUND EQUIPMENT REQUIRED   |
**************************************-------------------------------
                                      | DESCRIPTION        PART NO. |
                                      -------------------------------
                                      | HAND MICROPHONE             |
                                      | HEADSET                     |
                                      -------------------------------
****************************************************
* On lower centre console 9-211, on VHF control unit *
* [1] ([2]), select a new frequency, then carry out  *
* transmission : contact established.                *
****************************************************
     |   |
     |   |
     |   |          ------------------------------------------------
    NO   |-YES-----| Replace VHF control unit [1] ([2]). If :      |
     |              ------------------------------------------------
     |                  |
     |                  |
     |                  |      ---------------------------------
     |               NOT OK-| Replace transceiver [5] ([6]).   |
     |                         ---------------------------------
     |
     |
****************************************************
* In forward electronics racks, on shelf 3-215       *
* (5-216), on front panel of VHF transceiver [5]     *
* ([6]).                                             *
* - connect a hand microphone to MIC jack.           *
* - connect a headset to PHONE jack.                 *
* Press PTT switch on hand microphone and speak into *
* microphone. Check that TRANSMIT MONITOR indicator  *
* light illuminates.                                 *
****************************************************
     |   |
     |   |
     |   |          ------------------------------------------------
    NO   |-YES-----| Replace antenna [7] ([8]).                    |
     |              ------------------------------------------------
     |
     |
****************************************************
* Replace VHF transceiver [5] ([6]).                 *
****************************************************
```

Chart 104

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	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
R	[1] VHF Control unit		9-211	1R15	Flt. cpt	23-21-13 R/I	23-21-01
R	[2] VHF Control unit		9-211	2R15	Flt. cpt	23-21-13 R/I	23-21-02
	[3] Circuit breaker 28 VDC		1-213	1R17	Map Ref. J 19	24-50-00 R/I	23-21-01
	[4] Circuit breaker 28 VDC		15-216	2R17	Map Ref. F 12	24-50-00 R/I	23-21-02
R	[5] VHF Trans-ceiver	215ES	3-215	1R14	Forward electro-nics rack	23-21-33 R/I	23-21-01
R	[6] VHF Trans-ceiver	216ES	5-216	2R14	Forward electro-nics rack	23-21-33 R/I	23-21-01
	[7] Antenna		221	1R16	Lower fuselage	23-21-11 R/I	23-21-01
	[8] Antenna		132	2R16	Lower fuselage	23-21-18 R/I	23-21-02
R	[9] Captain's audio selector panel		7-211	R54	Flt. cpt	23-41-21 R/I	23-21-01 23-21-02
R	[10] 1st Offi-cer's audio selector panel		7-211	R54	Flt. cpt	23-41-21 R/I	23-21-01
R	[11] Flight Engineer's audio selector panel		8-214	R56	Flt. cpt	23-41-21 R/I	23-21-01 23-21-02

	ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
R	[12] 1st Super-numerary's audio selector panel		7-213	R55	Flt. cpt	23-41-21 R/I	23-21-01 23-21-02

Component Identification
Table 101

VERY HIGH FREQUENCY (VHF) - MAINTENANCE PRACTICES

1. General

Due to the vulnerability of the antenna to damage by baggage vehicles the following must be carried out :

A. After loading, a warning pennant must be fitted to draw attention to the antenna.

B. Before take-off ensure that the warning pennant is removed.

VERY HIGH FREQUENCY (VHF) - ADJUSTMENT/TEST

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	

B. Prepare

(1) Preferably place aircraft outside hangar.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Operate electronics rack ventilation (Ref. 21-21-00).

(4) Make certain that RAD-INT PTT switches are in the intermediate position on the following :

(a) Captain's and First Officer's control column handwheels.

(b) First Supernumerary's panel 3-213.

(c) Second Supernumerary's panel 20-215.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(a) The INT-R/T PTT switch is in the intermediate position.

(b) All keys on keyboard are disengaged.

(c) All reception push-buttons are disengaged.

(d) The BOOM-MASK switch is in the BOOM position.

(6) On Captain's jack panel connect a boomset to relevant HEADSET and MIC jacks.

(7) Make certain that the following circuit breakers are

set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VHF1 SUP	1-213	1R 17	J19
No.1 INPH SUP		R 89	K19
No.2 INPH SUP	3-213	R 90	H 2
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
VHF2 SUP	15-216	2R 17	F12

C. Test

(1) Check VHF Control Unit Lighting

(a) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob clockwise.

(b) On lower centre console 9-211, on VHF 1 and VHF 2 control units, make certain that :

- Integral lighting is in correct operating condition.
- Frequency display windows are illuminated.
- Green indicator light, above window selected by means of TFR switch, is illuminated.

(c) Adjust LIGHTING CENTRE CONSOLE PANEL knob to obtain desired lighting.

(2) Energize and operate VHF 1 (VHF 2) system in Transmit/ Receive Modes.

NOTE : The test described here applies VHF 1 system. For test of VHF 2 system read items or identifiers between brackets.

CAUTION : BEFORE TRANSMITTING, MAKE CERTAIN THAT THE SELECTED FREQUENCY IS FREE AND OBSERVE THE RADIO REGULATIONS.

(a) On upper centre console 7-211, on Captain's audio selector panel :

(a1) Engage VHF 1 (VHF 2) key on keyboard.

(a2) Engage VHF 1 (VHF 2) reception push-button and turn the integral potentiometer to intermediate position.

(b) On lower centre console 9-211, on VHF 1 (VHF 2) control unit :

- in RH and LH frequency display windows, select the frequency of the station with which communication is to be established.
- place TFR switch to the LH side. The green indicator light above LH frequency display window, illuminates.

(c) On Captain's control column handwheel, place and hold RAD-INT PTT switch in RAD position, then speak into boomset microphone and check in the earphones that sidetone is audible and correct.

(d) Release PTT switch, then check reception from the station in the boomset earphones.

(e) On lower centre console 9-211, on VHF 1 (VHF 2) control unit, place TFR switch to the RH side ; the green indicator light above RH frequency display window illuminates.

(f) On Captain's audio selector panel, place and hold INT-R/T PTT switch in R/T position, establish contact with the selected station and check in the earphones that sidetone is audible and correct.

(g) Release PTT switch and check reception from the station in the boomset earphones.

D. Close-Up

(1) On Captain's audio selector panel :

- Disengage VHF 1 (VHF 2) key on keyboard.
- Disengage VHF 1 (VHF 2) reception push-button, and turn integral potentiometer counterclockwise.

(2) On Captain's jack panel, disconnect boomset from HEADSET and MIC jacks.

(3) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

(4) Stop electronics rack ventilation (Ref. 21-21-00).

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
5 Boomsets	

B. Prepare

(1) Preferably place aircraft outside hangar.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Operate electronics rack ventilation (Ref. 21-21-00).

(4) Make certain that RAD-INT PTT switches are in the intermediate position on the following :

(a) Captain's and First Officer's control column hand-wheels

(b) First Supernumerary's panel 3-213

(c) Second Supernumerary's panel 20-215.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(a) The INT-R/T PTT switch is in the intermediate position.

(b) All keys on keyboard are disengaged.

(c) All reception push-buttons are disengaged.

(d) The BOOM-MASK switch is in the BOOM position.

(6) On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels connect a boomset to relevant HEADSET and MIC jacks.

(7) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VHF1 SUP	1-213	1R 17	J19
No.1 INPH SUP		R 89	K19
No.2 INPH SUP	3-213	R 90	H 2
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
VHF2 SUP	15-216	2R 17	F12

C. Test

(1) Check VHF Control Unit Lighting

(a) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob clockwise.

(b) On lower centre console 9-211, on VHF 1 and VHF 2 control units, make certain that :

- Integral lighting is in correct operating condition
- Frequency display windows are illuminated
- Green indicator light, above window selected by means of TFR switch, is illuminated.

(c) Adjust LIGHTING CENTRE CONSOLE PANEL knob to obtain desired lighting.

(2) Energize and operate VHF 1 (VHF 2) system in Receive Mode.

(a) On upper centre console 7-211, on Captain's audio selector panel :
- Engage VHF 1 (VHF 2) reception push-button.
- Turn integral potentiometer clockwise, to obtain a medium audio level.

(b) On lower centre console 9-211, on VHF 1 (VHF 2) control unit, using frequency selector knobs, display :
- In LH and RH windows, the frequency of a station

(c) On VHF 1 (VHF 2) control unit, move TFR switch to the LH side :

- Green indicator light above LH frequency display window illuminates.
- Station selected is received in boomset earphones.

(d) On Captain's audio selector panel, turn clockwise and then counterclockwise potentiometer integral with VHF 1 (VHF 2) reception push-button :
- Action must be progressive and must not cause any crackling.
- Adjust potentiometer to desired level.

(e) On VHF 1 (VHF 2) control unit, move TFR switch to the RH side :
- Green indicator light above RH frequency display window illuminates and green indicator light above LH frequency display window extinguishes.
- Station selected is received in boomset earphones.

(f) On First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, engage VHF 1 (VHF 2) reception push-button and make certain that :

- Turning clockwise and counterclockwise integral potentiometer results in a progressive action and causes no crackling.
- Station selected is received in boomset earphones.

(3) Operate VHF 1 (VHF 2) system in Transmit Mode.

CAUTION : BEFORE TRANSMITTING, MAKE CERTAIN THAT THE SELECTED FREQUENCY IS FREE AND OBSERVE THE RADIO REGULATIONS.

(a) On VHF 1 (VHF 2) control unit, select frequency of the station with which communication is to be established.

(b) On Captain's audio selector panel, engage VHF1 (VHF 2) key on keyboard.

(c) On Captain's control column handwheel, place and hold RAD-INT PTT switch in RAD position, speak into microphone and make certain that :

- VHF 1 (VHF 2) transceiver is transmitting.
- Sidetone is audible and correct.

(d) Release PTT switch :

- VHF 1 (VHF 2) transceiver stops transmitting.

(e) On Captain's audio selector panel, place and hold INT - R/T PTT switch in R/T position, and make certain that :

- VHF 1 (VHF 2) transceiver is transmitting.
- Sidetone is audible and correct.

(f) Release PTT switch

- VHF 1 (VHF 2) transceiver stops transmitting.

(g) Repeat operations 2. C. (3) (b), 2. C. (3) (e) and 2. C. (3) (f) from First Officer's, Flight Engineer's and First Supernumerary's audio selector panels. Results must be identical.

(h) On First Supernumerary's panel 3-213, place and hold RAD-INT PTT switch in RAD position, and speak into microphone :

- VHF 1 (VHF 2) transceiver is transmitting.
- Sidetone is audible and correct.
- Release PTT switch.

(i) On Second Supernumerary's panel 20-215, place and hold RAD-INT PTT switch in RAD position, and speak into microphone :

- VHF 1 (VHF 2) transceiver is transmitting.
- Sidetone is audible and correct.
- Release PTT switch.

NOTE : This operation is carried out through Flight Engineer's audio selector panel.

D. Close-Up

(1) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :

- Disengage VHF 1 (VHF 2) key on keyboard.
- Disengage VHF 1 (VHF 2) reception push-button, and turn integral potentiometer counterclockwise.

(2) On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels, disconnect boomset from HEADSET and MIC jacks.

(3) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

(4) Stop electronics rack ventilation (Ref. 21-21-00).

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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3. System Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
5 Boomsets	
1 VHF in line Wattmeter (0-50 W from 116 to 150 MHz)	

B. Prepare

(1) Remove panels allowing access to shelves in forward electronics racks in zone 215 (216).

(2) Refer to paragraph 2. B.. Same operations as in functional test.

C. Test

(1) Check VHF Control Unit Lighting

Identical with that of functional test. Refer to paragraph 2. C. (1).

(2) Energize and operate VHF 1 (VHF 2) system in Receive mode.

Identical with that of functional test. Refer to 2. C. (2).

(3) Operate VHF 1 (VHF 2) in Transmit Mode

CAUTION : BEFORE TRANSMITTING, MAKE CERTAIN THAT THE SELECTED FREQUENCY IS FREE AND OBSERVE THE RADIO REGULATIONS.

(a) On VHF 1 (VHF 2) control unit, select frequency of the station with which communication is to be established.

(b) On Captain's audio selector panel, engage VHF 1 (VHF 2) key on keyboard.

(c) On Captain's control column handwheel, place and hold RAD-INT PTT switch in RAD position, speak

into microphone and make certain that :

- Indicator light located on VHF 1 (VHF 2) transceiver front panel is illuminated, thus indicating that system is transmitting.
- Sidetone is audible and correct.

(d) Release PTT switch :

- VHF 1 (VHF 2) transceiver stops transmitting.
- Indicator light on VHF 1 (VHF 2) transceiver front panel extinguishes.

(e) On Captain's audio selector panel, place and hold INT-R/T PTT switch in R/T position, then make certain that :

- Indicator light located on VHF 1 (VHF 2) transceiver front panel is illuminated, thus indicating that system is transmitting.
- Sidetone is audible and correct.

(f) Release PTT switch :

- VHF 1 (VHF 2) transceiver stops transmitting.
- Indicator light on VHF 1 (VHF 2) transceiver front panel extinguishes.

(g) Repeat operations 3. C. (3) (b), 3. C. (3) (e) and 3. C. (3) (f) front First Officer's, Flight Engineer's and First Supernumerary's audio selector panels. Results must be identical.

(h) On First Supernumerary's panel 3-213, place and hold RAD-INT PTT switch in RAD position and speak into microphone :

- Indicator light located on VHF 1 (VHF 2) transceiver front panel is illuminated, thus indicating that system is transmitting.
- Sidetone is audible and correct.
- Release PTT switch.

(i) On Second Supernumerary's panel 20-215, place and hold RAD-INT PTT switch in RAD position and speak into microphone :

- Indicator light located on VHF 1 (VHF 2) transceiver front panel is illuminated, thus indicating that system is transmitting.
- Sidetone is audible and correct.

- Release PTT switch.

(4) Measure VHF 1 (VHF 2) system standing wave ratio (SWR)

(a) In LH (RH) electronics rack, on shelf 3-215, (5-216) disconnect antenna connector from connector 1R20A (2R20A).

(b) Interpose a directional wattmeter between transceiver and antenna co-axial cable to be checked.

(c) On Captain's control column handwheel, place and hold RAD-INT PTT switch in RAD position and speak into microphone:

- Measure and record transmitted and reflected power for the following frequencies: 118, 127 and 135.975 MHz.

(d) Using the following formula, calculate standing wave ratio (SWR):

$$SWR = \frac{1 + \text{Square root of } \frac{\text{Reflected Power}}{\text{Transmitted Power}}}{1 - \text{Square root of } \frac{\text{Reflected Power}}{\text{Transmitted Power}}}$$

Resulting SWR for the three frequencies must be lower than or equal to 2.

(e) Disconnect wattmeter and connect co-axial cable to connector on shelf in LH (RH) electronics rack.

(5) Check VHF 1 (VHF 2) system remote frequency display control

(a) Establish contact with one or several local VHF stations (CONTROL TOWER, APPROACH CONTROL, LOCAL CONTROL, WORKSHOP).
- The radio communications must be correct for all frequencies.

D. Close-Up

(1) Repeat operations as described in paragraph 2. D., Functional Test.

(2) Install access panels previously removed to reach shelves of forward electronics racks in zone 215 (216).

VHF1 ANTENNA - REMOVAL/INSTALLATION

1. General

Removal for replacement or check.

2. VHF1 Antenna

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform, 7.021 m (23 ft.)	
Circuit Breaker Safety Clips	
Sealant (Ref. 20-30-00, No.364)	

B. Prepare

(1) On panel 1-213, trip, safety and tag circuit breaker VHF1 SUP (1R17) (map ref. J19).

(2) Position access platform.

C. Remove (Ref. Fig. 401)

(1) Supporting the antenna, unscrew antenna base side screws (1) and (2).

NOTE : End screws (1) are not identical with centre screws (2) and, therefore, must be identified in view of the subsequent installation.

(2) Vertically lift up the antenna by a few inches ; disconnect connector (3) and block the coaxial cable in order to prevent if from sliding out of its housing.

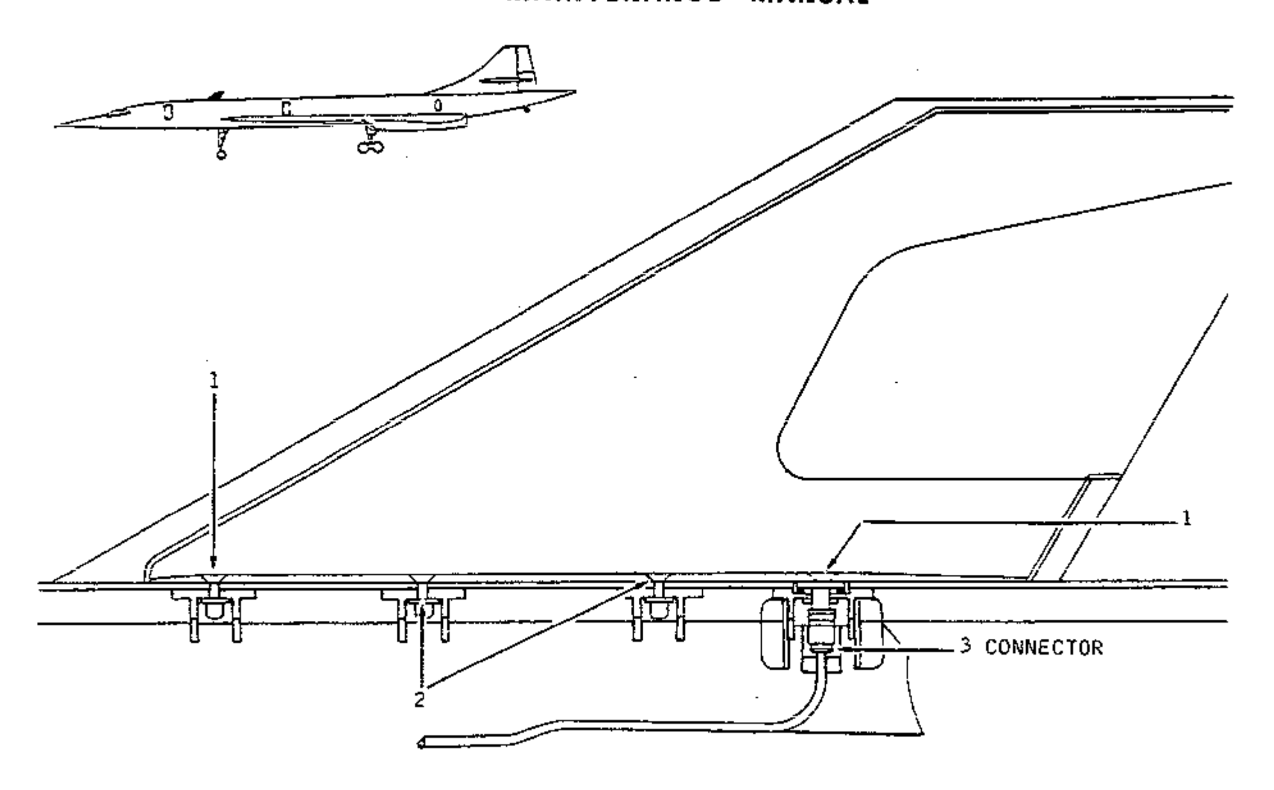
(3) On the fuselage, clean the area adjacent to the antenna seat.

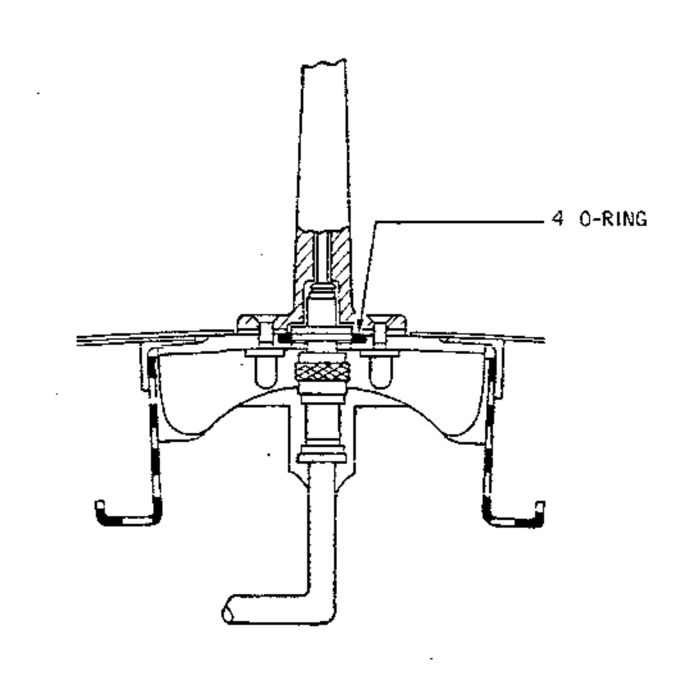
(4) Remove and discard O-ring (4) and clean its housing.

(5) Check the coaxial connector for correct condition.

D. Preparation of Replacement Component

(1) Check visually that the antenna is in correct condi-





CMA 23 21 11 4 AAMO

R VHF1 Antenna - Removal/Installation
Figure 401

tion, and particularly that the coaxial socket shows no sign of corrosion.

E. Install

(1) Coat new O-ring (4) with Product No.364 and install.

(2) Offer up the antenna and connect the coaxial cable connector (3) to its socket.

(3) Guiding the coaxial cable, bring the antenna down, to contact with the fuselage.

(4) Position center screws (2) on both sides of the antenna, and screw them by a few turns.

(5) Position end screws (1) on both sides of the antenna, and screw them by a few turns.

(6) Sparingly tighten end screws (1) and then centre screws (2).

F. Tests

(1) On panel 1-213, remove safety clip and tag and reset circuit breaker VHF1 SUP, (1R17) (map ref. J19).

(2) Carry out an operational test (Ref. 23-21-00, A/T).

E. Close-Up

(1) Remove access platform.

VHF CONTROL UNIT - REMOVAL/INSTALLATION

1. General

Two VHF control units 1R15 and 2R15 are installed in flight compartment, on lower center console 9-211.

2. VHF Control Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets, if necessary.	

B. Prepare

(1) On roof panel 4-211, make certain that CENTRE CONSOLE PANEL selector switch is placed in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VHF 1 SUP	1-213	1R 17	J19
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
VHF 2 SUP	15-216	2R 17	F12

C. Remove

(1) Refer to 23-00-00 Removal/Installation, paragraph 3.D

D. Preparation of Replacement Component

(1) Refer to 23-00-00, Removal/Installation, paragraph 3.E

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 3.F

F. Close-Up

(1) Remove safety clips and tags and reset circuit breakers tripped in 2.B (2)

(2) Carry out operational test of VHF control unit (Ref. 23-21-00, Adjustment/Test).

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VHF2 GLIDE ANTENNA - MAINTENANCE PRACTICES

1. General

Due to the vulnerability of the antenna to damage by baggage vehicles the following must be carried out.

A. After landing, a warning pennant must be fitted to draw attention to the antenna.

B. Before take-off ensure that the warning pennant is removed.

Printed in England

VHF2 GLIDE ANTENNA - REMOVAL/INSTALLATION

1. General

This topic covers removal/installation procedure following antenna replacement or check.
As the antenna is common to both the VHF2 System and the ILS Systems, any work carried out on either part of the antenna requires its removal or replacement, even when it is operating correctly in one of the two functions.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Access Platform - 2.7 m (8 ft 9 in)	-
Circuit Breaker Safety Clips	-
Sealant (Ref. 20-30-00, No.364)	-

B. Prepare

(1) Trip, safety and tag the following circuit breakers:

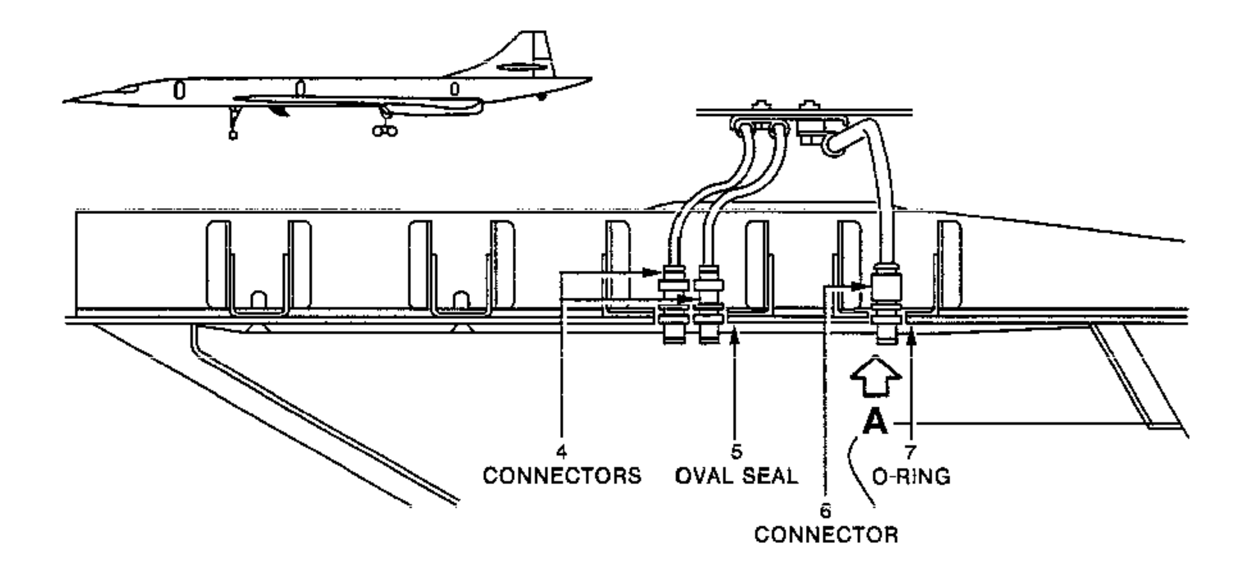
SERVICE	PANEL	CIRCUIT BREAKER	MAP REF
ILS VHF NAV1 SUP	2-213	IR 25	G 6
ILS VHF NAV2 SUP	13-216	2R 25	E15
VHF2 SUP	15-216	2R 17	F12

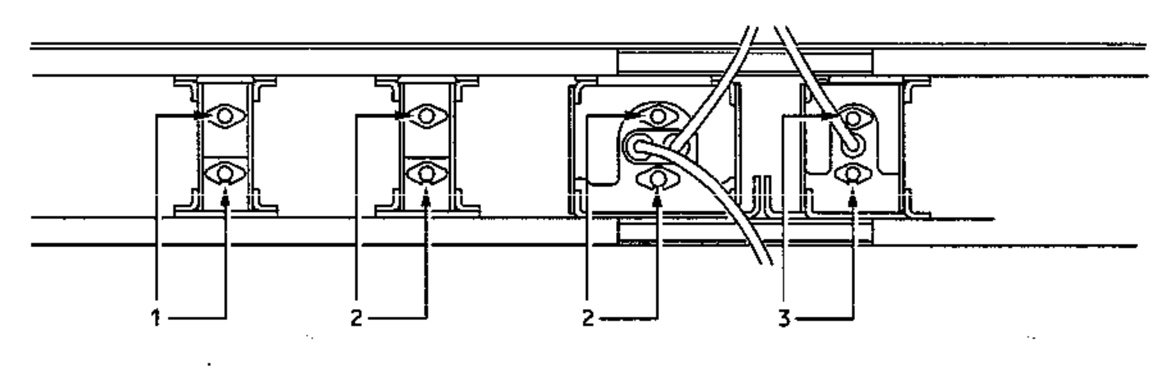
(2) Position access platform.

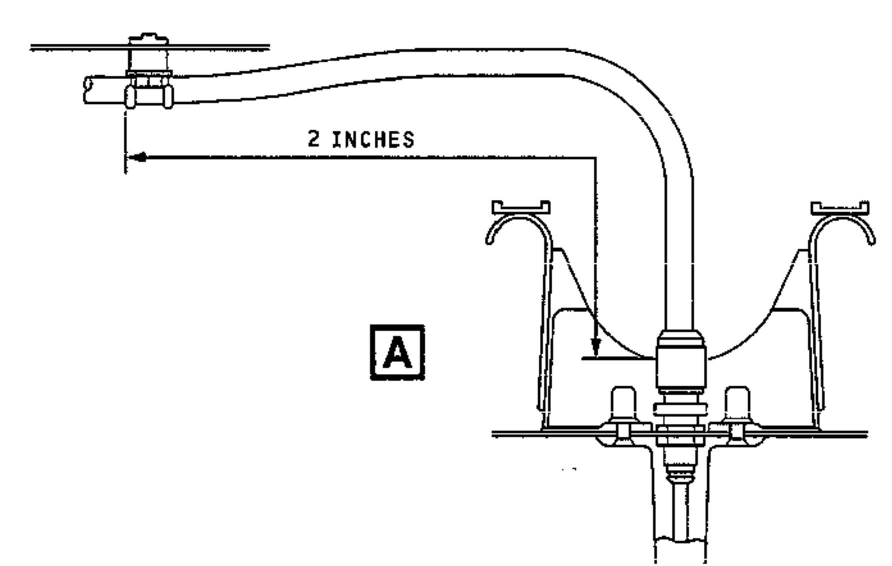
RB C. Remove (Ref. Fig. 401 and 402)

RB (1) Supporting the antenna, remove antenna base side screws (1), (2) and (3) (Chelton Antenna Pt. No. 19-180 (2) and (3) only).

RB NOTE: End screws (1) and (3) are not identical with centre screws (2) and, therefore, must be identified in view of the subsequent installation.







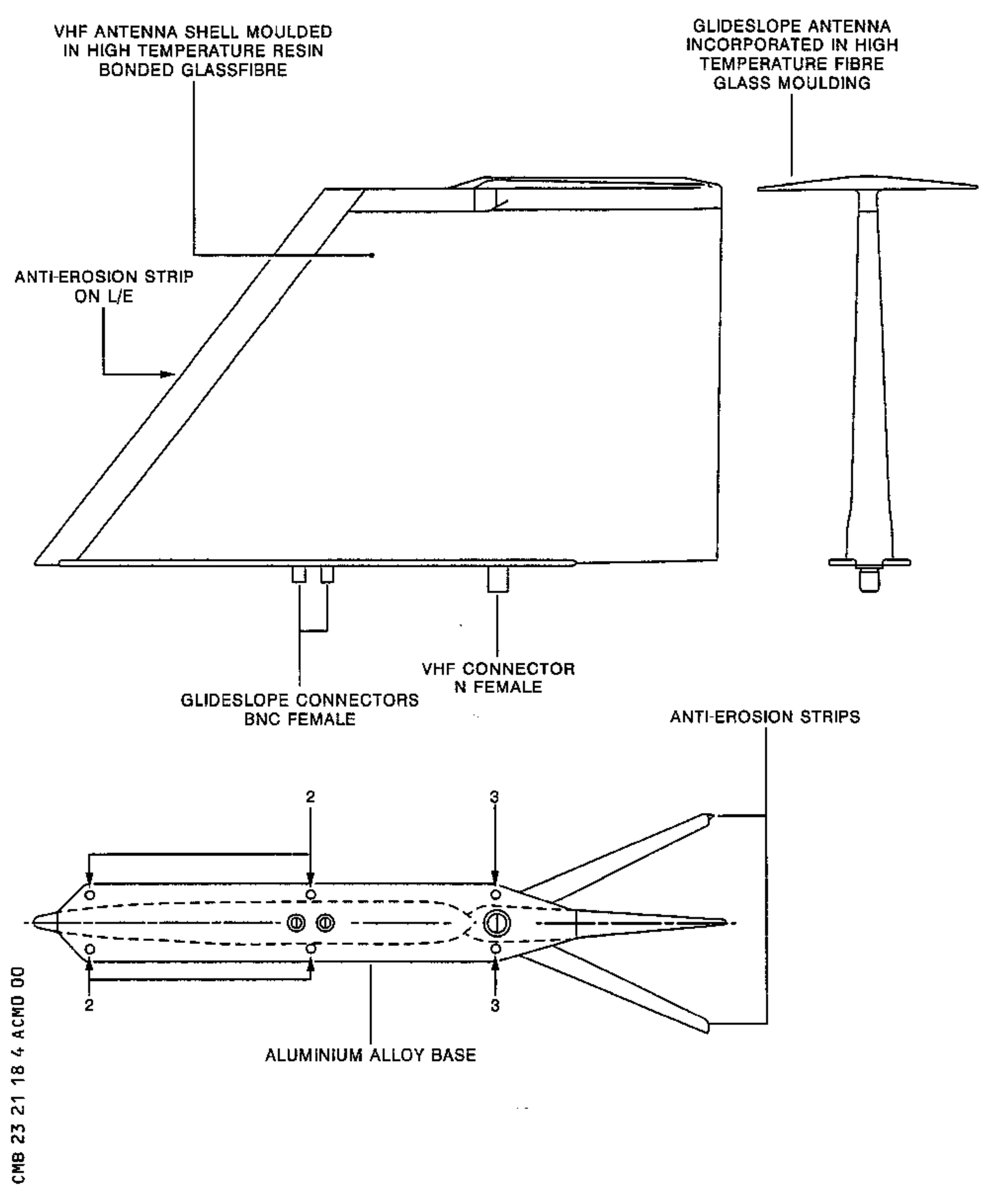
PRINTED IN ENGLAND

CMB 23 21 18 4 AAM0 00

RB

VHF2 Glide Antenna : Removal/Installation
Figure 401

PRINTED IN ENGLAND



Chelton VHF - Glideslope Antenna - Type 19-180
Figure 402

RB

(2) Slowly bring antenna down by approximately 2 inches (50.8 mm). Disconnect coaxial connectors (4) from the GLIDE assembly, and connector (6) from VHF assembly.

(3) On fuselage, clean area adjacent to antenna seat.

(4) Remove and discard seals (5) and (7) and clean their housings thoroughly.

(5) Examine coaxial connectors (4) and (6) for correct condition.

D. Preparation of Replacement Component

(1) Visually examine that antenna is in correct condition. Particularly check that connectors show no sign of corrosion.

RB E. Install (Ref. Fig. 401 and 402)

RB NOTE: If Chelton Antenna Pt. No. 19-180 was removed but
RB alternative antenna is being fitted, remove blanking
RB screws from forward fixing holes (Ref. Fig. 403).

(1) Coat new oval seal (5) and new O-ring (7), with product No.364 and install.

(2) Offer up antenna, connect coaxial connectors (4) and (6) to their respective receptacles.

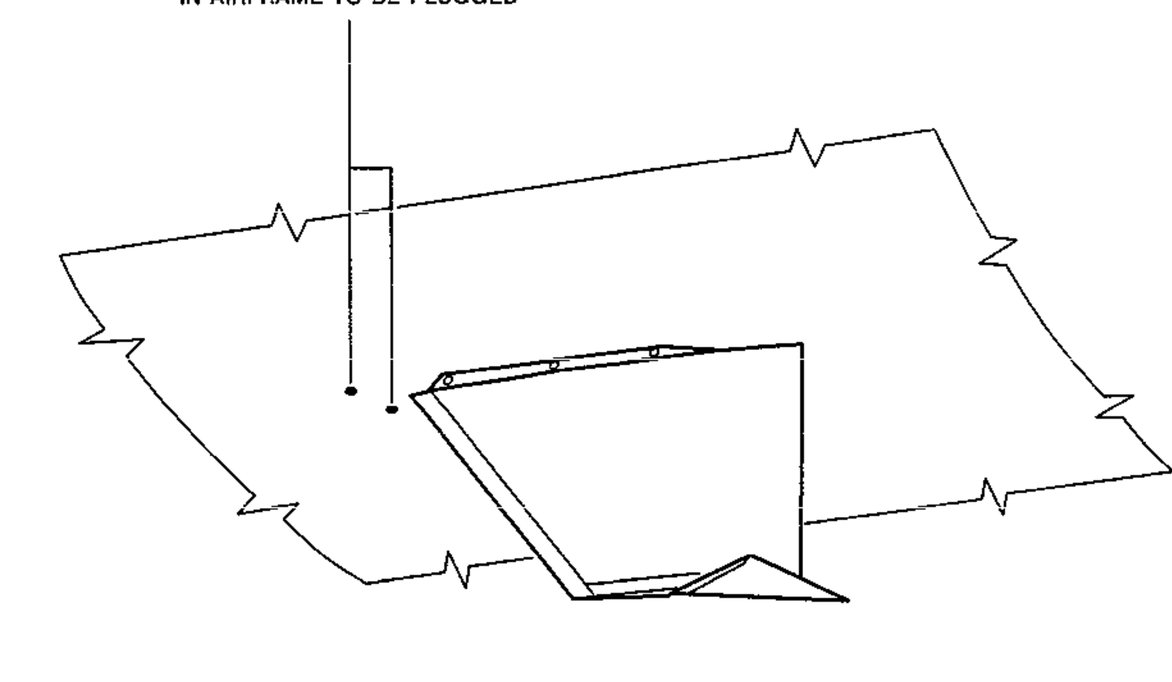
(3) Bring antenna to contact with fuselage, carefully guiding the coaxial cables.

(4) Position centre screws (2) on both sides of antenna and screw them by a few turns.

RB (5) Position end screws (1) and (3) on both sides of
RB antenna, Chelton Antenna Pt. No. 19-180 (3) only, and
RB screw them by a few turns.

RB (6) Carefully tighten end screws (1) and/or (3) and then
RB centre screws (2).

RB NOTE: If fitting Chelton Antenna Pt. No. 19-180, the
RB forward redundant fixing holes are to be
RB blanked using pan head 10-32 screws
RB (Ref. Fig. 403).



RB Chelton VHF Dual Glideslope Antenna Type 19-180 - Installation
Figure 403

F. Test

(1) Remove safety clips and tags, and reset circuit breakers previously tripped in paragraph 2.B.(1).

(2) Carry out an operational test of VHF2 System (Ref. 23-21-00, Adjustment/Test).

(3) Carry out an operational test of ILS Systems (Ref. 34-36-00, Adjustment/Test).

G. Close-Up

(1) Remove access platform.

VHF TRANSCEIVER - REMOVAL/INSTALLATION

1. General

Two VHF transceivers are installed in LH and RH forward electronics racks.
VHF1 transceiver 1R14 is installed on shelf 3-215.
VHF2 transceiver 2R14 is installed on shelf 5-216.

2. VHF Transceiver

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets	

B. Prepare

(1) Trip, safety and tag the following circuit breakers

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VHF1 SUP	1-213	1R17	J19
VHF2 SUP	15-216	2R17	F12

(2) On RH forward electronics rack, remove panel 216ES giving access to shelf 5-216 on which VHF2 transceiver is installed.

(3) On LH fwd electronics rack, remove panel 215ES giving access to shelf 3-215 on which VHF1 transceiver is installed.

NOTE : As both transceivers are identically installed, only one removal/installation is described.

C. Remove

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.D.

D. Preparation of Replacement Component

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.E.

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.F.

F. Close-Up

(1) Remove safety clips and tags and reset circuit breakers tripped in paragraph 2.B.(1).

(2) Carry out test of VHF transceiver concerned (Ref. 23-21-33, Adjustment/Test).

(3) On forward electronics rack install panels 215ES or 216ES.

VHF TRANSCEIVER - ADJUSTMENT/TEST

1. General

Check of VHF transceiver(s) for correct operation after removal/installation.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Headset	
1 Hand Microphone	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Operate radio electronics racks ventilation (Ref. 21-21-00).

(3) On front face of VHF transceiver make certain that :

(a) headset is connected to PHONE jack

(b) hand microphone is connected to MIC jack

C. Test

(1) Listen to background noise from transceiver in headset.

(2) Press PTT switch on hand microphone and speak :

(a) Check that voice is heard in headset.

(b) Check that TRANSMIT MONITOR indicator light located on transceiver front face comes on.

D. Close-Up

(1) On VHF transceiver tested

(a) Disconnect headset from PHONE jack

(b) Disconnect hand microphone from MIC jack

(2) Stop radio electronics rack ventilation (Ref. 21-21-00)

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

END OF THIS SECTION

NEXT

SELCAL - DESCRIPTION AND OPERATION

1. General

The SELCAL (SELECTIVE CALLING) system provides indication to the Captain or the First Officer through a warning system, that a ground radio station is wishing to establish communication with them exclusively, even if many other aircraft are in flight at the same time.
This system relieves the crew of an aircraft from permanent monitoring of ground radio stations, the broadcasts of which are not all addressed to them.

2. System Components

The SELCAL system comprises :

- 1 selcal decoder (R111)
- 1 control unit.

R **ON A/C 006-007,
3. Selcal Decoder - MOTOROLA NA135

A. Description (Ref. Fig. 001)

(1) Mechanical Characteristics

The selcal decoder is fitted in a 1/4 ATR short case ; its weight is 4.300 Kg (9.5 lbs).

(a) On the front face are located :

- A carrying handle
- A locking tab for fixing the case on its base.
- Two vertical rows of four code display control knobs with twelve positions corresponding to both channels of operation.
- Above each knob, a code display window, where the designated letter (A to M, I excluded) appears.

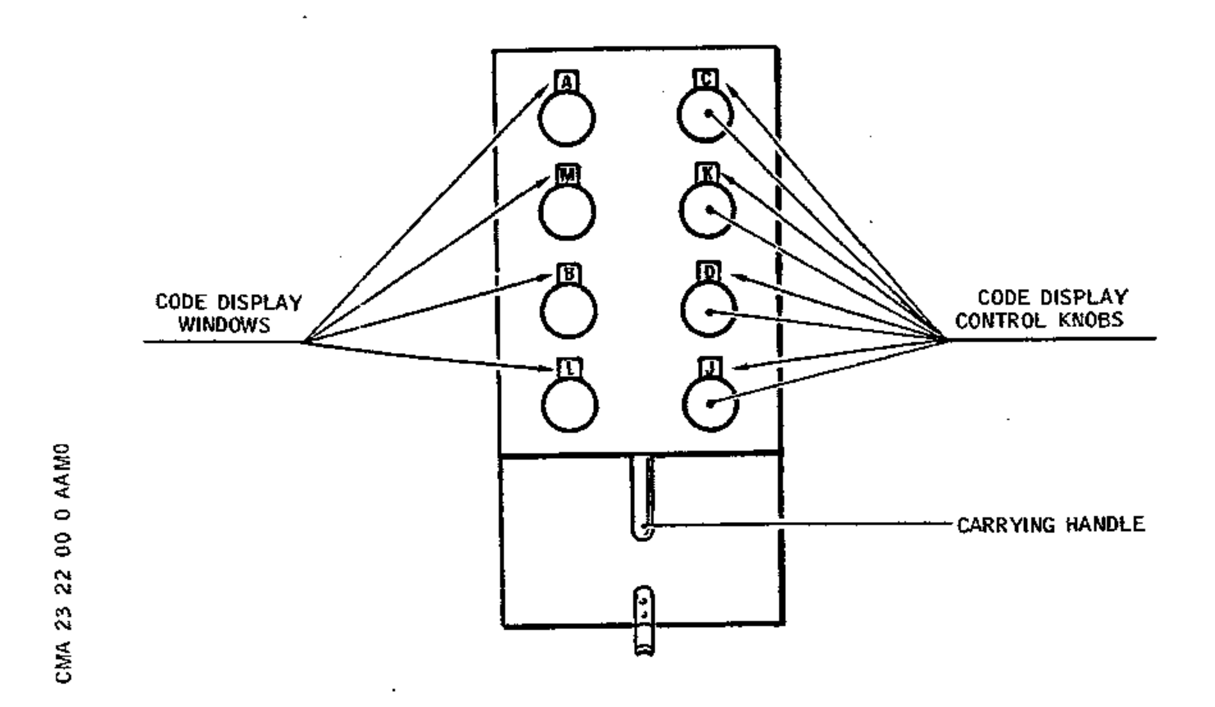
(b) On the rear face, is a connector for connection of the decoder to the aircraft electrical network

(2) Electrical Characteristics

The selcal decoder is completely transistorized ; it is fitted up with a set of vibrasponders (resonant relays).

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R **ON A/C 006-007,



Selcal Decoder : Front Face
Figure 001

ting relays.
It comprises two channels, which are fully identical and independent from each other. The power is supplied at 28 VDC and the current drawn is 0.15 AMP.

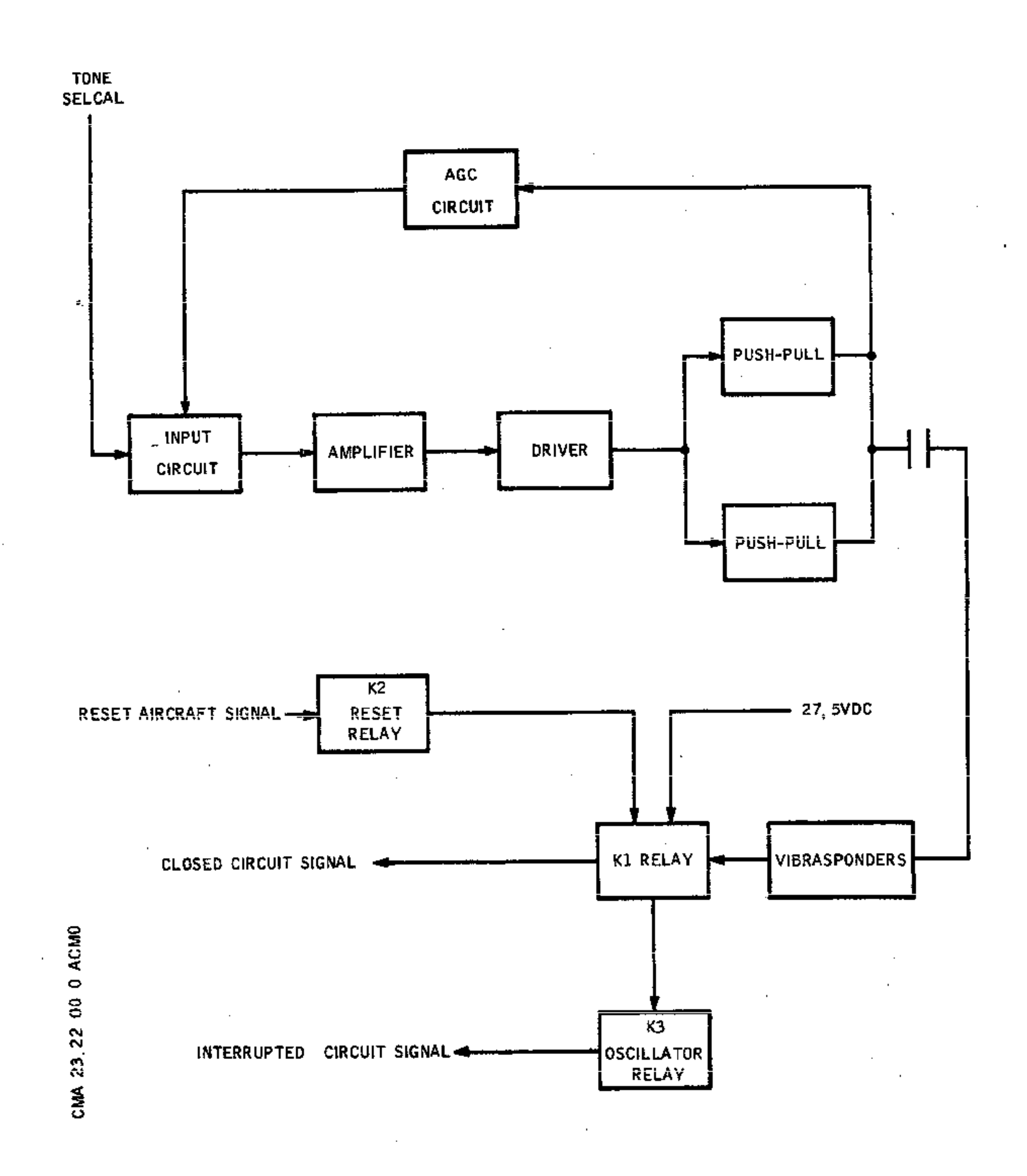
B. Operation (Ref. Fig. 002)

The selcal decoder being equipped with two independent, but identical channels, only one of those will be described. A channel comprises three main circuits :

- An amplifier circuit
- A vibrasponders circuit.
- A warning distribution circuit.

(1) Amplifier circuit

The selcal signal from the ground radio-station is fed to the input circuit, which, in turn, feeds it to the input amplifier through a coupling transfor-



Selcal Decoder - Block Diagram
Figure 002

mer. The amplified signal is fed to a driver-amplifier which applies it to a push-pull output amplifier, connected by capacitors to the vibrasponders circuit. An AGC feedback circuit returns to the input circuit so as to maintain a constant output level.

(2) Vibrasponders circuit

The coding of one of the channels is obtained by means of the four display control knobs on the front face of the decoder. The selection of four letters in a given order results in connecting in series the four vibra-sponders corresponding to the four letters in the same order.
These frequency-sensitive relays, connected to the output of the push-pull amplifier, when vibrating, feed the decoded signal to the warning distribution circuit.

(3) Warning distribution circuit

The decoded signal from the vibrasponders is fed to a transistor switch, which controls the warning relays. In the absence of a signal, the transistor switch is at cut-off, the aural-warning relays are at rest and no signal is fed.
When fed with a signal, the transistor switch is unlocked, K1 relay is energized and feeds a + 28 VDC voltage :

- To the warning DC circuit, for the AUDIO-WARNING
- To an oscillator controlling K3 relay, which then beats at the oscillator frequency (1 Hz per second), causing an indicator light to flash K2 RESET relay provides shunting of a ground connection on K1 relay, which then is energized, thus bringing the selcal circuit back to its initial state.

**ON A/C 001-005,

3. Selcal Decoder - MARCONI A.9002-2

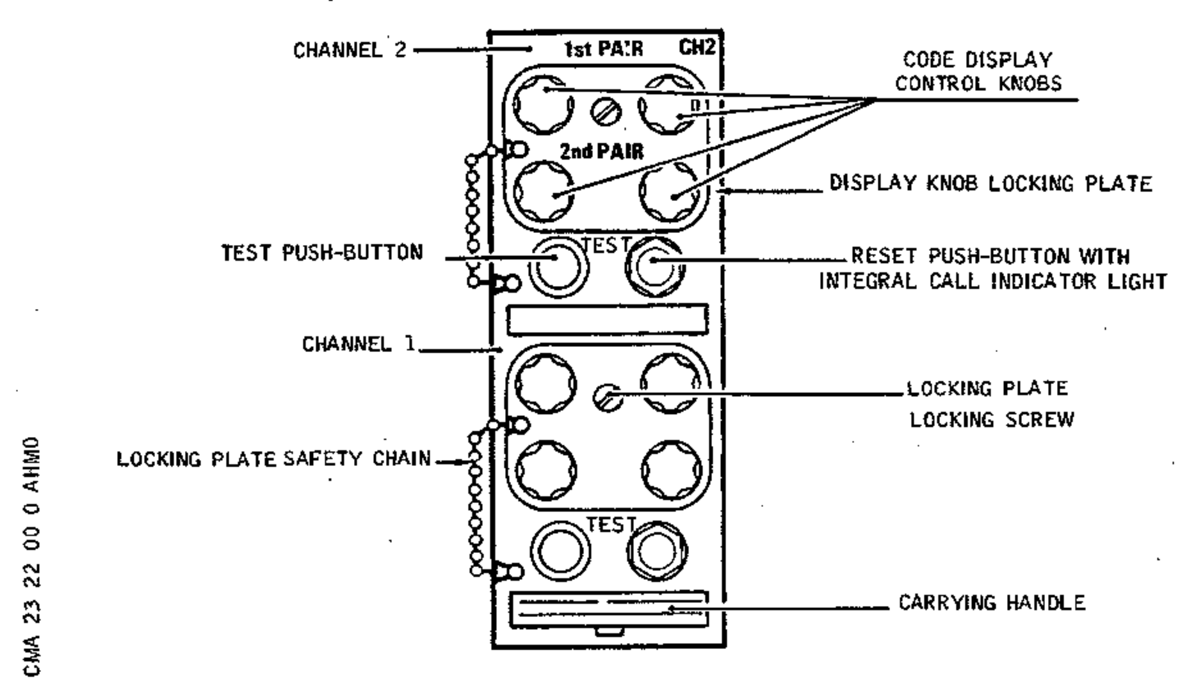
A. Description (Ref. Fig. 003)

(1) Mechanical characteristics

The selcal decoder is fitted in a standard ARINC 1/4 ATR short case ; its weight is 3 kg 180 (7.0 lb.).

(a) On the front face are located :

R **ON A/C 001-005,



Selcal Decoder - Front Face
Figure 003

(a1) At the upper part, a group of four code display control knobs associated with channel 2. Each control knob covers twelve letters, from A to M (I excluded).
A locking plate locks the four control knobs after the code is displayed in order to avoid any casual positioning.
Under the group of the four control knobs are located :

- A TEST push-button (self-check circuit inoperative due to modification asked for by the airline).
- An indicator light incorporated in a push-button comes on when the ground radio call corresponds to the code displayed. The light goes off when pressed or during a reset procedure.

(a2) At the lower part, a group of four code

display control knobs associated with channel 1, a TEST push-button and an integrally lighted push=button.
The description is the same as that of channel 2.

(a3) A carrying handle.

(a4) A locking tab for fixing the case on its base.

(b) On the rear face is an electrical connector for connection to the aircraft electrical network.

(2) Electrical characteristics

The Selcal decoder is completely transistorized ; it is fitted up with a set of resonant reed relays. It comprises two channels which are fully identical and independent from each other.
The power supplied is 28 VDC and the power drawn is 12 Watts maximum.

B. Operation (Ref. Fig. 004)

The selcal decoder being equipped with two independent but, identical channels, only one of these will be described.

A channel comprises five main circuits :

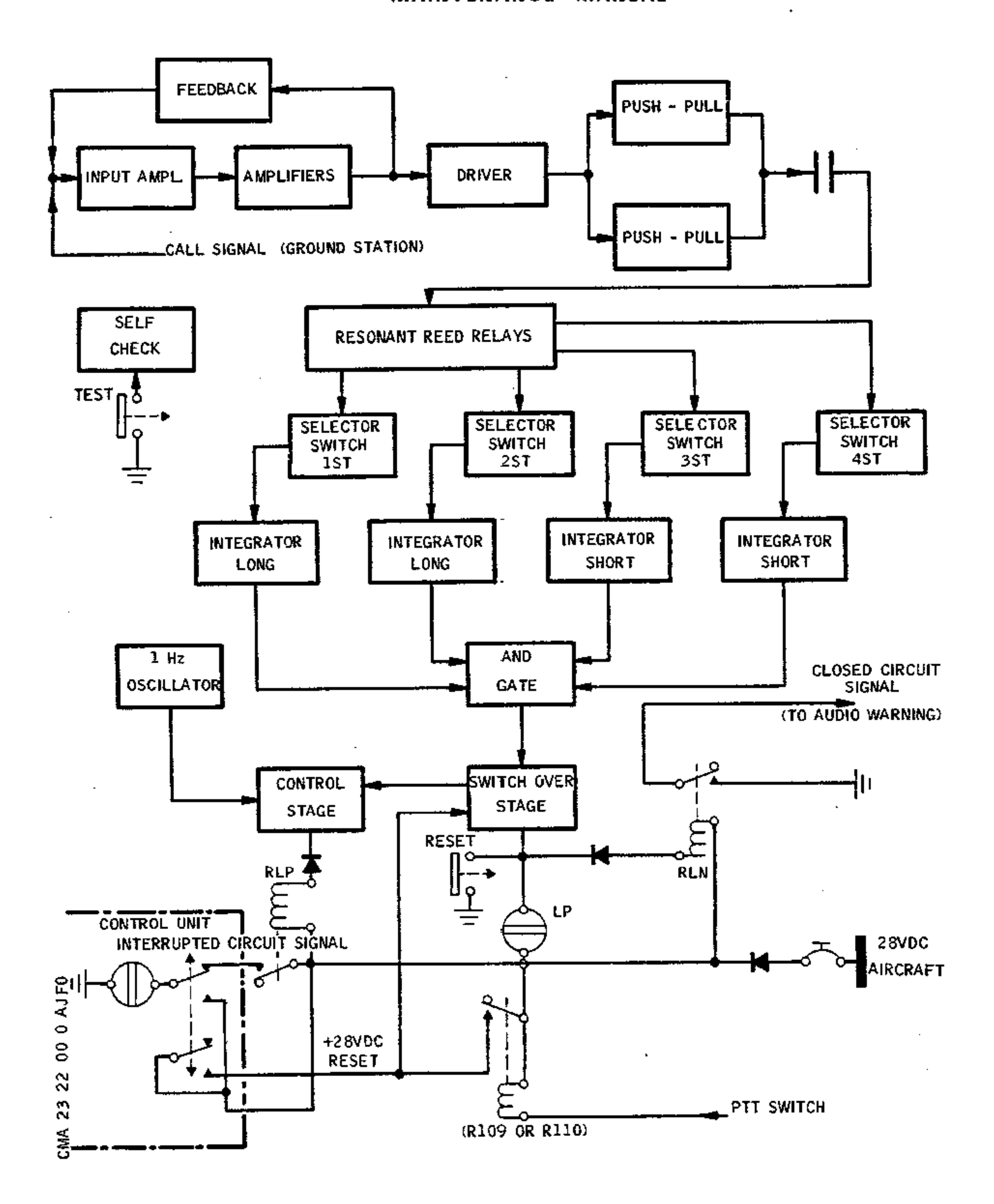
- An amplifier circuit
- A resonant reed relay circuit
- An integrator circuit with an AND gate
- A warning control circuit
- A self-check circuit (disconnected)

(1) Amplifier circuit

The selcal signal from the ground radio station is fed to the input stage and then to amplifiers in assembly order.
Power-amplified by a final push-pull stage, the signal is fed to the coils of the resonant relays.
There is a feed-back on the amplifier stages in order to maintain a constant signal level.

(2) Resonant reed relay circuit

The signal from the push-pull amplifier is fed to the resonant reed relays.
The coding is obtained by means of control knobs



Selcal Decoder - Block Diagram
Figure 004

located on the front face of the decoder. The selection of four letters in a given order results in connecting in the same order the corresponding resonant relays.
When the signal frequency corresponds to the natural frequency of the relays, a pulse is fed to the integrator circuit which sensitizes the AND gate.

(3) Integrator circuit and AND gate

The pulse from the resonant reed relays is fed to the integrator circuit.
The integrator circuit consists of two parts :

- A long circuit for the first pair of the signal (short charging, long discharging).
- A short circuit for the second pair of the signal (short charging and discharging).

When the signal received from the ground radio station corresponds to the frequency displayed by the control knobs, the resonant reed relays feed a pulse to the integrator stage which then conducts, thus closing the AND gate which enables the switch-over stage to energize the warning control circuit.
If a pair of pulses of the signal, or one single pulse, is of wrong frequency, the integrators reject the pulse, and no signal is fed to the switch-over stages via the AND gate which is open.

(4) Warning control circuit

(a) Distribution circuit

The signal from the integrator circuit enabled by the AND gate allows the switch-over stage to control the warning circuit. This is performed by :

- permanent illumination of LP light located on the front face of the decoder. This indicator light receives a + 28 VDC signal from the aircraft electrical network and a ground signal from the switch-over stage.
- A closed circuit signal which is applied to an audio warning circuit through relay RLN energized by the ground signal from the switch-over stage and the 28 VDC from aircraft electrical network.
- Illumination of the light on control unit at 1 Hz frequency.

A relaxation oscillator feeds a 1 Hz frequency pulse to the control stage which is slaved to the switch-over stage. When the pulse is applied to the control stage, this energizes relay RLP which then feeds the + 28 VDC to the indicator light on the control unit. The pulse being no longer fed, the relay is de-energized and the indicator light extinguishes ; when a new pulse is fed, the light is alternatley on and off.

(b) Reset circuit

The warning output can be cancelled either by a ground signal or by a + 28 VDC signal.

(b1) Ground reset

When pressing LP light on the front of the decoder, a ground signal is fed to the switch-over stage. The indicator lights extinguish and the ground signal to the audio warning circuit is off.

(b2) 28 VDC reset

When pressing the indicator light on the control unit, a + 28 VDC is fed to the switch-over stage which inhibits the call. The lights extinguish and the ground signal to the audio warning circuit is off.

When the push-to-talk switch of one of the HF1, HF2, VHF1, VHF2 components is pressed, a + 28 VDC is applied to the same circuit as previously mentionned and the result is identical.

(5) Self-check

The self-check circuit has been disconnected due to a modification asked for by the airline.

R **ON A/C 006-007,

3. Selcal Decoder - MARCONI A9002-2 or MOTOROLA NA135

This two equipments are operationally interchangeable.

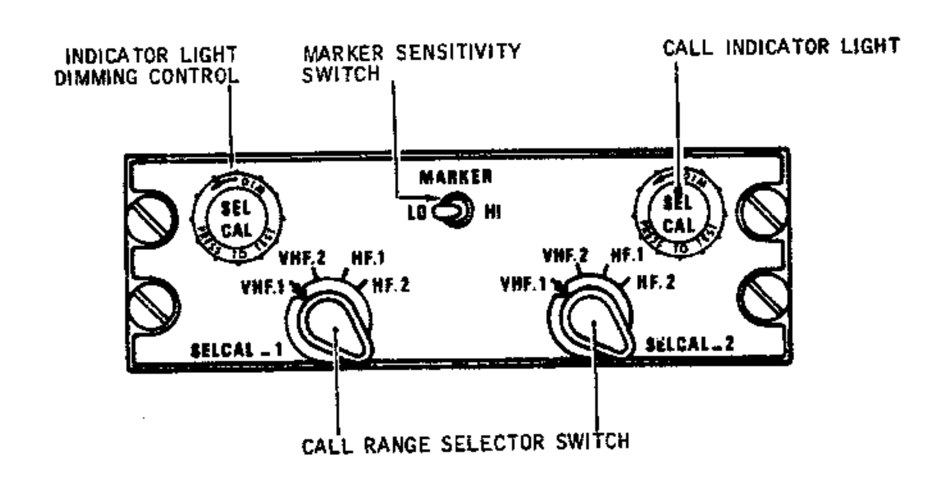
4. Selcal Control Unit - GABLES G.3963

A. General

The selcal control unit located on center console provides remote control of :

- The selcal decoder, so that a call in the HF or VHF band, from a ground radio-station, may be received
- The sensitivity of the marker receiver (MARKER).

B. Description - Operation (Ref. Fig. 005)



CMA 23 22 00 0 AJM0

SELCAL - Control Unit
Figure 005

(1) On the front are located :

(a) The channel 1 controls, marked SELCAL 1, and comprising :

- An amber call indicator light.
  This indicator light flashes when a call is decoded. It turns off when the call is not in accordance with the aircraft code of if the push-to-talk switch of one of the HF or VHF receivers has been operated.
  It keeps illuminated when held pressed ; it

turns off when released (indicator light test). During the test, the decoder is in reset phase, and thus will not be able to flash.
Turning the indicator light counterclockwise causes the light to be dimmed.

- A four position selector switch
  This selector switch, marked VHF1-VHF2-HF1-HF2, provides selection of the VHF or HF listening means and choice of the unit.

(b) For channel 2, a SELCAL 2 label, covering :

- An amber SELCAL indicator light
- A four position selector-switch.
  (These controls operate in the same way as those of channel 1).

(c) A MARKER "HI-LO" switch

This switch provides adjustment of marker receiver sensitivity. The sensitivity is high in position HI and low in position LO.

5. Operation

A. Principle

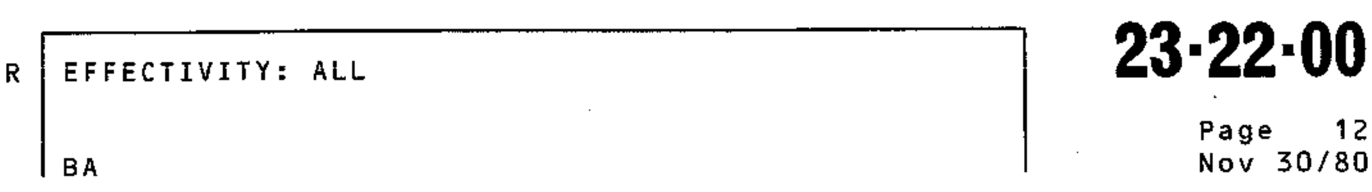
The selcal system assigns a particular code to each aircraft : therefore, the ground radio operator has only to compose the code assigned to a particular aircraft. The SELCAL unit of that aircraft will receive that code and eliminate all the others.
The call-code consists of a combination of four letters selected from among the twelve available letters "A" to "M", the letter I being excluded (e.g. : AM-BL).
Each letter corresponds to a transmitting frequency of the ground radio-station. The four frequencies of a code are transmitted in two pairs of pulses, each of one second duration, after an interval of 1/10 to 1/20 second between two successive pairs.
When the code transmitted by the ground station corresponds to the aircraft code, the crew is given notice through aural and visual warnings.

B. Channel Selection (Ref. Fig. 006)

The selcal decoder comprises two identical channels (channel 1 and channel 2) which can be operated simulteneously. The system is energized by closing circuit breakers R117, for channel 1, and R118, for channel 2.

CALL INDICATOR LIGHT 2
CALL INDICATOR 1
TEST CHANNEL 2
TEST CHANNEL 1
CONTROL BOX (R231)
SELECTION CONTROL HF1-VHF1-VHF2-HF2 (CHANNEL 1)
SELECTION CONTROL (CHANNEL 2)
R117
28VDC
PTT SWITCH
RELAY R109
RE-SET
HF1 TRANSCEIVER
PTT SWITCH
SIGNAL
SIGNAL
CHANNEL 1
SIGNAL
VHF1 TRANSCEIVER
RELAY R121
RELAY R122
PTT SWITCH
DECODER SELCAL (R111)
SIGNAL
VHF2 TRANSCEIVER
RELAY R119
RELAY R120
PTT SWITCH
SIGNAL
HF2 TRANSCEIVER
RELAY R123
RELAY R124
SIGNAL
PTT SWITCH
RELAY R110
RE-SET
R118
28VDC
GROUND CALL STATION
AUDIO WARNING SYSTEM
CHANNEL 2
AURAL WARNING
CHANNEL 1
CMA 23 22 00 0 ANMO

Selcal - Block Diagram
Figure 006



Three relays R121, R119, R123, controlled by the SELCAL 1 selector switch, comprise two circuits, which are used as follows :

- The first circuit for calls from VHF and HF receivers,
- The second circuit for automatic wash-out of the call, through the push-to-talk switches and relay R109.

The three relays are energized by the 28 VDC from circuit breaker R117, according to the selection on SELCAL 1 selector switch of the control unit :

- R121 when the selector switch is in VHF1 position
- R119 when the selector switch is in VHF2 position
- R123 when the selector switch is in HF2 position
- When the selector switch is in HF1 position, the three relays are de-energized and the signal from the HF1 receiver is obtained directly.

The HF1, VHF1, HF2, VHF2 signals selected through SELCAL 1 selector switch are fed to channel 1 of the decoder.

Three relays R122, R120, R124, controlled by SELCAL 2 selector switch comprise two circuits, which are used as follows :

- The first circuit for calls from VHF and HF receivers,
- The second circuit for automatic wash-out of the call, through the push-to-talk switches and relay R110.

The three relays are energized by the 28 VDC from circuit breaker R118, according to the selection on SELCAL 2 selector switch of the control unit :

- R122 when the selector switch is in VHF1 position
- R120 when the selector switch is in VHF2 position
- R124 when the selector switch is in HF2 position
- When the selector switch is in HF1 position, the three relays are de-energized and the signal from the HF1 receiver is obtained directly.

The HF1, VHF1, HF2, VHF2 signals selected through SELCAL 2 selector switch are fed to channel 2 of the decoder.

C. Calling

When a call from a ground radio station is transmitted in the HF or VHF band, after selection through SELCAL 1 or SELCAL 2 selector switch on the control unit, it is directed to the first stage of the corresponding relay, which feeds it to the decoder, on the designated channel.

If the code corresponds to the frequency set on the decoder, SELCAL 1 or SELCAL 2 indicator light of the control unit flashes and the aural warning sounds.

NOTE : For all the duration of that function, relays R109 and R110 are de-energized.

D. Resetting

(1) The aural warning only can be cancelled by the AUDIO-CANCEL button of the aural warning panel.

(2) The aural warning and the visual warning (indicator lights on the control unit) are cancelled by action on the push-to-talk switches which are at the disposal of the crew members.
The push-to-talk switch signal from the HF1 receiver or from the six relays is fed to the relays R109 or R110, which are thus energized and move to work position, feeding a 28 VDC reset voltage to the designated channel of the decoder. That action results in switching off :

- The SELCAL 1 or SELCAL 2 indicator light of the control unit,
- The aural warning of the audio warning system.

(3) The warnings are cancelled by action on the SELCAL indicator light (test function) : a 28 VDC reset voltage is then fed to the decoder.

(4) Warnings are cancelled by action on the indicator light located on the front face of the decoder.

E. Tests

When the SELCAL indicator light of channel 1 or channel 2 is pressed, the + 28 VDC from the corresponding circuit breaker is fed to :

- The SELCAL 1 or SELCAL 2 indicator light, which comes on
- The selected channel of the decoder, resulting in a reset signal, which prevents warning signals from being fed to the audio warning system and to the indicator lights.

SELCAL - TROUBLE SHOOTING

WARNING : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the Selcal system to be quickly rectified.
The defects can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.
Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information including component location required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).
As the two Selcal channels are identical, trouble shooting procedures are described for SELCAL 1 channel. For SELCAL 2 channel, refer to numbers between parentheses.
SELCAL 1 indicator light (LH side) is supplied with power through channel 1 of SELCAL decoder, SELCAL 2 indicator light being supplied with power through channel 2.
Both Selcal channels trigger the some circuit in the audio warning system.

2. Prepare

A. In zone 216, remove panels allowing access to shelves in forward electronics rack.

B. Make certain that all PTT switches are in intermediate position.

C. On Captain's (First Officer's) jack panel, connect a boomset to HEADSET and MIC jacks.

D. On Captain's (Frist Officer's) audio selector panel, make certain that :

- All keys on keyboard are disengaged
- All reception push-buttons are disengaged

- BOOM-MASK switch is in BOOM position

E. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VHF 1 SUP	1-213	1R 17	J19
No1 INPH SUP	1-213	R 89	K19
HF 1 DC SUP	1-213	1R 3	L20
AUDIO WARN SYS SUP1	1-213	W 371	M21
HF 1 AC SUP	2-213	1R 4	H19
NO2 INPH SUP	3-213	R 90	H 2
AUDIO WARN SYS SUP 2	5-213	W 372	C17
SELCAL No1 SUP	15-215	R 117	F18
HF 2 AC SUP	13-216	2R 4	G 7
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
SELCAL No2 SUP	15-216	R 118	E13
VHF 2 SUP	15-216	2R 17	F12
HF 2 DC SUP	15-216	2R 3	F13

F. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

G. Operate electronics rack ventilation (Ref. 21-21-00).

H. On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob clockwise and check that Selcal control unit integral lighting operates correctly.

I. On Captain's console 1-211 and on First Officer's console 1-212, place LOUDSPEAKER ON-OFF switch in ON position.

3. Trouble Shooting

```
*****************************************************
* On upper centre console 7-211, on Selcal control  *
* unit [1], press and hold both SELCAL indicator    *
* lights, they illuminate.                          *
*****************************************************
   ||       |    ---------------------------------------------------
   OK    NOT OK----| SELCAL indicator lights not illuminated.      |
   ||              | Ref. Chart 101.                               |
   ||            ---------------------------------------------------
*****************************************************
* 1. On upper centre console 7-211:                 *
* (a) On selcal control unit [1], successively place*
*     RH (LH) selector switch in VHF1, VHF2, HF1 and*
*     HF2 positions.                                *
*     NOTE: When RH (LH) selector switch is placed  *
*           in VHF mode, LH (RH) selector switch    *
*           shall be placed in HF mode or vice versa*
* (b) On Captain's [2] (First Officer's [3]) audio  *
*     selector panel, according to mode selected on *
*     Selcal control unit:                          *
*     - Engage relevant key on keyboard             *
*     - Engage relevant reception push-button and   *
*       adjust the integral potentiometer to inter- *
*       mediate position.                           *
*                                                   *
* 2. On lower centre console 9-211:                 *
* (a) On VHF1 [4] (VHF2 [5]) control unit, select   *
*     the frequency of the control radio station.   *
* (b) On HF control unit [6], on HF1 (HF2) side :   *
*     - Select the frequency of the control radio   *
*       station.                                    *
*     - Place OFF-AM-SSB function selector switch in*
*       AM position.                                *
*                                                   *
* 3. Ask control radio station to call the aircraft *
*    by means of Selcal system selected for each    *
*    specific mode and check:                       *
*    - that LH (RH) SELCAL indicator light flashes  *
*    - that a repetitive two-tone aural signal is   *
*      heard in audio warning loudspeakers.         *
*****************************************************
    ||    |
    ||    |
    ||    |
    ||    |
```

```
    ||     |
    ||     |        -------------------------------------------------
    ||     |        | With Selcal system selected successively in    |
    OK    NOT OK----| VHF1, VHF2, HF1 and HF2 modes, no flashing of  |
    ||     |        | channel 1 (channel 2) SELCAL indicator light   |
    ||     |        | and no aural signal heard. Ref Chart 102.      |
    ||     |        -------------------------------------------------
    ||     |        -------------------------------------------------
    ||     |        | With Selcal system selected successively in    |
    ||     |        | VHF1, VHF2, HF1 and HF2 modes, flashing of     |
    OK    NOT OK----| channel 1 (channel 2) SELCAL indicator light   |
    ||     |        | But no aural signal heard. Ref Chart 103.      |
    ||     |        -------------------------------------------------
    ||     |        -------------------------------------------------
    ||     |        | With Selcal system selected successively in    |
    ||     |        | VHF1, VHF2, HF1 and HF2 modes, no flashing of  |
    OK    NOT OK----| channel 1 (channel 2) SELCAL indicator light   |
    ||     |        | but aural signal heard. Ref Chart 104.         |
    ||     |        -------------------------------------------------
    ||     |        -------------------------------------------------
    ||     |        | With Selcal system selected in one of the four |
    ||     |        | communications modes, no flashing of channel 1 |
    OK    NOT OK----| (channel 2) indicator light and no aural signal|
    ||     |        | heard. Ref Chart 105.                          |
    ||     |        -------------------------------------------------
*****************************************************
* On upper centre console 7-211, on Selcal control  *
* unit [1], after each call, press LH (RH) SELCAL   *
* indicator light:                                  *
* - SELCAL indicator light extinguishes.            *
* - The aural signal stops                          *
*****************************************************
    ||     |        -------------------------------------------------
    ||     |        | Channel 1 (channel 2) SELCAL indicator light   |
    OK    NOT OK----| and aural signal are still activated.          |
    ||     |        | Ref. Chart 106.                                |
    ||              -------------------------------------------------
*****************************************************
* Using successively all communication modes, renew *
* call on Selcal channel 1 (channel 2) and each time*
* cancel indicator light and aural signal by placing*
* PTT switch on Captain's (First Officer's) audio   *
* selector panel in R/T position or PTT switch on   *
* control column in RAD position.                   *
*****************************************************
    ||     |
    ||     |
    ||     |
    ||     |
```

```
   ||    |
   ||    |
   ||    |      -------------------------------------------------
   OK    NOT OK----| Channel 1 (channel 2) SELCAL indicator light   |
   ||              | and aural signal are still activated on one of |
   ||              | the 4 communication modes. Ref Chart 108.       |
   ||      -------------------------------------------------
*****************************************************
* Selcal system is operational.                     *
*****************************************************
```

```
*************************************----------------------------------
* SELCAL INDICATOR LIGHTS NOT ILLU-  *| GROUND EQUIPMENT REQUIRED   |
* MINATED.                           *|-----------------------------|
**************************************| DESCRIPTION        PART NO. |
                                      |-----------------------------|
                                      | MULTIMETER                  |
                                      -------------------------------

*****************************************************
* Check 28VDC at output of circuit breakers [7]     *
* ([8]).                                            *
*****************************************************
    |       |
    |       |      ------------------------------------------------
   NO      YES----| Replace Selcal control unit [1].               |
    |              ------------------------------------------------
    |
-----------------------------------------------------
| Replace circuit breaker [7] ([8]).                |
-----------------------------------------------------
```

Chart 101

```
*************************************
* WITH SELCAL SYSTEM SELECTED IN VHF1*
* VHF2, HF1 AND HF2 MODES, CHANNEL 1 *
* (CHANNEL 2) SELCAL INDICATOR LIGHT *
* DOES NOT FLASH AND AURAL SIGNAL IS *
* NOT HEARD.                         *
*************************************

*****************************************************
* No aural and visual indicating on selected channel.*
* On Selcal control unit [1], select other channel;  *
* the associated indicator light flashes and the     *
* aural signal is actirated.                         *
*****************************************************
             |
             |    -----------------------------------------------
          YES---| Replace Selcal decoder [9].                    |
                  -----------------------------------------------
```

Chart 102

```
**************************************
* WITH SELCAL SYSTEM SELECTED IN VHF1*
* VHF2, HF1 AND HF2 MODES, CHANNEL 1 *
* (CHANNEL 2) SELCAL INDICATOR LIGHT *
* FLASHES BUT NO AURAL SIGNAL HEARD. *
**************************************

*****************************************************
* No aural signal during check of Selcal channel 1  *
* (channel 2) in all four communication modes while *
* indicator light illuminates.                      *
* On Selcal control unit [1], select other channel: *
* the aural signal is activated.                    *
*****************************************************
    |        |
    |        |    -----------------------------------------------------
    NO       YES---| Replace Selcal decoder [9].                        |
    |             -----------------------------------------------------
    |
-----------------------------------------------------
| See audio warning system (Ref 31-23-00, Trouble   |
| Shooting)                                         |
-----------------------------------------------------
```

Chart 103

```
*************************************
* WITH SELCAL SYSTEM SELECTED IN VHF1*
* VHF2, HF1 AND HF2 MODES, CHANNEL 1 *
* (CHANNEL 2) SELCAL INDICATOR LIGHT *
* DOES NOT FLASH BUT AURAL SIGNAL IS *
* HEARD.                             *
*************************************


-----------------------------------------------------
| Replace Selcal decoder [9].                       |
-----------------------------------------------------
    |
    |          -----------------------------------------------------
    NOT OK-----| Replace Selcal control unit [1].                  |
               -----------------------------------------------------
```

Chart 104

WITH SELCAL SYSTEM SELECTED IN ONE OF THE FOUR COMMUNICATION MODES, CHANNEL 1 (CHANNEL 2) SELCAL INDICATOR LIGHT DOES NOT FLASH AND AURAL SIGNAL IS NOT HEARD.	GROUND EQUIPMENT REQUIRED	
	DESCRIPTION	PART NO.
	MULTIMETER	-

Trip circuit breakers [7], [8].
On upper centre console 7-211, remove Selcal control unit [1].
On Selcal control unit, check continuity between contacts of LH (RH) selector switch placed as follows:
- VHF1 position: check between pins P and L (V and Z)
- VHF2 position: check between pins P and M (V and Z)
- HF2 position : check between pins P and K (V and X)

There is continuity.

YES: On shelf 5-216, on relay base, remove faulty relay on channel 1 (channel 2).
- VHF1: relay [10] ([11])
- VHF2: relay [12] ([13])
- HF2 : relay [14] ([15])

NOT OK: If reception from VHF or HF system is considered as correct, replace faulty VHF transceiver [16] or [17], or replace faulty HF transceiver [18] or [19].

NO: Replace Selcal control unit [1].

Chart 105

```
**************************************
* AFTER RESET, CHANNEL 1 (CHANNEL 2) *
* SELCAL INDICATOR LIGHT AND AURAL   *
* SIGNAL ARE STILL ACTIVATED.        *
**************************************

*********************************************************
* On Captain's (First Officer's) audio selector panel,  *
* place PTT switch in R/T position, or on Captain's     *
* (First Officer's) control column handwheel, place PTT *
* switch in RAD position.                               *
* Channel 1 (channel 2) SELCAL indicator light extin-   *
* guishes and aural signal stops.                       *
*********************************************************
     |        |
     |        |   -----------------------------------------------
    NO       YES---| Replace Selcal control unit [1].            |
     |            -----------------------------------------------
     |
---------------------------------------------------------
| Replace Selcal decoder [9].                           |
---------------------------------------------------------
```

Chart 106

AFTER RESET, CHANNEL 1 (CHANNEL 2) SELCAL INDICATOR LIGHT AND AURAL SIGNAL ARE STILL ACTIVATED ON ONE OF THE FOUR COMMUNICATION MODES.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

After reset, channel 1 (channel 2) aural and visual indicating remains on one of the four communication modes.
On Selcal control unit [1], place selector switch in a position corresponding to operating mode.
On Captain's (First Officier's) audio selector panel place PTT switch in R/T position or on Captain's (First officer's) control column handwheel, place PTT switch in RAD position. Check that associated SELCAL indicator light extinguishes and aural signal stops.

YES:

Trip circuit breaker [7], [8].
On shelf 5-216, remove the two screws attaching relay base and tilt it forwards.
Replace relay [20] ([21]).

NO:

Trip circuit breakers [7], [8].
On shelf 5-216, remove the two screws attaching relay base and tilt it forwards.
Remove diode assembly on RH side of base plate.
According to circuit involved, replace diode as follows
- HF1 : diode [22]
- HF2 : diode [23]
- VHF1: diode [24]
- VHF2: diode [25]

Chart 107

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[1] Selcal control unit		7-211	R135 orR231	Flt. Cpt	23-22-13 R/I	23-22-01
[2] Captain's audio selector panel		7-211	R53	Flt. Cpt	23-41-21 R/I	23-22-01 23-51-01
[3] First Officer's audio selector panel		7-211	R54	Flt. Cpt	23-41-21 R/I	23-22-01 23-51-01
[4] VHF1 control unit		9-211	1R15	Flt. Cpt	23-21-13 R/I	23-21-01
[5] VHF2 control unit		9-211	2R15	Flt. Cpt	23-21-13 R/I	23-21-02
[6] HF control unit		9-211	R2	Flt. Cpt	23-11-13 R/I	23-11-01
[7] Circuit breaker, 28VDC		15-215	R117	Map Ref.	24-50-00 R/I	23-22-01
[8] Circuit breaker, 28VDC		15-216	R118	Map Ref.	24-50-00 R/I	23-22-01
[9] Selcal Decoder		5-216	R111	Fwd electronics rack	23-22-33 R/I	23-22-01
[10] Relay		5-216	R123	Fwd electronics rack		23-22-01
[11] Relay		5-216	R124	Fwd electronics rack		23-22-01
[12] Relay		5-216	R121	Fwd electronics rack		23-22-01

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[13] Relay		5-216	R122	Fwd electro-nics rack		23-22-01 23-22-01
[14] Relay		5-216	R119	Fwd electro-nics rack		23-22-01
[15] Relay		5=216	R120	Fwd electro-nics rack		23-22-01
[16] VHF1 transceiver		3-215	1R14	Fwd electro-nics rack	23-21-33 R/I	23-22-01
[17] VHF2 transceiver		5=216	2R14	Fwd electro-nics rack	23-21-33 R/I	23-22-01
[18] HF1 transceiver		2-243	1R1	Fwd electro-nics rack	23-11-33 R/I	23-22-01
[19] HF2 transceiver		2-244	2R1	Fwd electro-nics rack	23-11-33 R/I	23-22-01
[20] Relay		5-216	R109	Fwd electro-nics rack		23-22-01
[21] Relay		5-216	R110	Fwd electro-nics rack		23-22-01
[22] Relay		5-216	R125	Fwd electro-nics rack		23-22-01
[23] Relay		5-216	R126	Fwd electro-nics rack		23-22-01

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[24] Relay		5-216	R127	Fwd electro- nics rack		23-22-01
[25] Relay		5-216	R128	Fwd electro- nics rack		23-22-01

Component Identification
Table 101

SELCAL - ADJUSTMENT/TEST

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	

B. Prepare

(1) For this test, preferably place the aircraft, outside hangar in the event that HF system should be used.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Operate electronics rack ventilation (Ref. 21-21-00).

(4) Make certain that RAD-INT PTT switches are in the intermediate position on the following :

(a) Captain's and First Officer's control column handwheels.

(b) First Supernumerary's panel 3-213.

(c) Second Supernumerary's panel 20-215.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(a) The INT-R/T PTT switch is in the intermediate position.

(b) All keys on keyboard are disengaged.

(c) All reception push-buttons are disengaged.

(d) The BOOM-MASK switch is in BOOM position.

(6) On Captain's console 1-211 and on First Officer's console 1-212 :

(a) Place LOUDSPEAKER ON-OFF switch in ON position.

(7) On HF dual control unit, make certain that OFF-AM-SSB function selector switches (HF1 - HF2 system) are in OFF position.

(8) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HF1 DC SUP	1-213	1R 3	L20
VHF1 SUP		1R 17	J19
No.1 INPH SUP		R 89	K19
AUDIO WARN SYS SUP 1		W 371	M21
HF1 AC SUP	2-213	1R 4	H19
No.2 INPH SUP	3-213	R 90	H 2
AUDIO WARN SYS SUP 2	5-213	W 372	C17
PLT'S LT TEST SUP	15-215	L1001	E14
SELCAL No.1 SUP		R 117	F18
HF2 AC SUP	13-216	2R 4	G 7
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
SELCAL No.2 SUP	15-216	R 118	E13
VHF2 SUP		2R 17	F12
HF2 DC SUP		2R 3	F13

(9) On Captain's and First Officer's jack panels :

- Connect boomsets to HEADSET and MIC jacks.

C. Test

NOTE : The decoder used by the Airline does not include self-test facility.

(1) Test indicator lights

(a) On panel 4-211, turn clockwise LIGHTING CENTRE CONSOLE PANEL knob.

- On upper centre console 7-211, Selcal control

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unit integral lighting is activated.

(b) On Selcal control unit, press and hold LH SELCAL indicator light (SELCAL channel 1) :

- The indicator light illuminates.
- Turn indicator light cap counterclockwise ; indicator light is dimmed ; then, adjust indicator light cap to normal position.

(c) Release LH SELCAL indicator light (SELCAL channel 1) :

- The indicator light extinguishes.

(d) On SELCAL control unit, press and hold RH SELCAL indicator light (SELCAL channel 2) :

- The indicator light illuminates.
- Turn indicator light cap counterclockwise : indicator light is dimmed ; then, adjust indicator light cap to normal position.

(e) Release RH SELCAL indicator light (SELCAL channel 2) :

- The indicator light extinguishes.

(2) Check SELCAL 1 and SELCAL 2 channels in VHF band

WARNING : THIS TEST CAN ONLY BE CARRIED OUT WITH THE ASSISTANCE OF A GROUND STATION HAVING A SELCAL CODER.
THE GROUND STATION MUST SELECT THE SAME CODE NUMBER AS THAT DISPLAYED ON THE AIRCRAFT DECODER.

NOTE 1 : The call aural warning generated by the Audio-Warning system, may be cancelled by pressing the AUDIO CANCEL push-buttons located on panel 4-211.

NOTE 2 : This test can be carried out with either VHF or HF systems
The test described here applies to VHF 1 system. If HF1 system is to be used, start up the system and follow the sequence of operations given between brackets.
Proceed in the same way for test of systems 2, replacing system 1 by system 2.

(a) On lower centre console 9-211, on VHF1 control unit (HF1 channel of HF dual control unit) select the frequency of the radio station with which contact is to be established.

(b) On upper centre console 7-211, on Selcal control unit, place :

- LH selector switch in VHF1 (HF1) position
- RH selector switch in a position different from that selected before.

(c) On Captain's audio selector panel :

- Engage VHF1 (HF1) key on keyboard
- Engage VHF1 (HF1) reception push-button and place integral potentiometer in intermediate position.

(d) Establish communication in VHF (HF) band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(e) From the outset of the call make certain that :

(e1) On Selcal control unit, LH SELCAL indicator light flashes.

(e2) A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(f) On Selcal control unit, press LH SELCAL indicator light and check that :

- SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

(g) On upper centre console 7-211, on Selcal control unit, place :

- RH selector switch in VHF1 (HF1) position
- LH selector switch in a position different from that selected before.

(h) Establish communication in VHF (HF) band with the ground radio station, then ask for a new test call.

(i) From the outset of the call, make certain that :

(i1) On Selcal control unit, RH SELCAL indicator light flashes.

(i2) A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(j) On Captain's audio selector panel, place INT-R/T PTT switch in R/T position or on Captain's control column handwheel place RAD-INT PTT switch in RAD position :

- RH SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

D. Close-Up

(1) If the test has been carried out in HF band, on HF dual control unit, place function selector switch of channel used in OFF position.

(2) On Captain's audio selector panel :
- Disengage VHF1 (HF1) key on keyboard
- Disengage VHF1 (HF1) reception push-button.

(3) On Captain's jack panel, disconnect boomset from HEADSET and MIC jacks.

(4) On Captain's console 1-211 and on First Officer's console 1-212, place LOUDSPEAKER ON-OFF switch in OFF position.

(5) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

(6) Stop electronics rack ventilation (Ref. 21-21-00).

(7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

Refer to Paragraph 1. A. Identical.

B. Prepare

Repeat operations described in Paragraph 1. B.

C. Test

(1) Test indicator lights

Repeat operations described in Paragraph 1. C. (1).

(2) Check SELCAL 1 and SELCAL 2 channels in VHF band.

CAUTION : THIS CHECK CAN ONLY BE CARRIED OUT WITH THE ASSISTANCE OF A GROUND STATION HAVING A SELCAL CODER.
THE GROUND STATION MUST SELECT THE SAME CODE NUMBER AS THAT SELECTED ON THE AIRCRAFT DECODER.

NOTE 1 : The call aural warning generated by the audio warning system may be cancelled by pressing one of the AUDIO CANCEL push-buttons located on panel 4-211.

NOTE 2 : The test described here applies to Selcal operation with VHF1 system. For VHF2 system read items given between brackets.

(a) On lower centre console 9-211, on VHF1 (VHF2) control unit, select the frequency of the radio station with which contact is to be established.

(b) On upper centre console 7-211, on Selcal control unit place :

- LH selector switch in VHF1 (HF1) position
- RH selector switch in HF2 (VHF2) position.

(c) On Captain's audio selector panel :

- Engage VHF1 (VHF2) key on keyboard
- Engage VHF1 (VHF2) reception push-button and place integral potentiometer in intermediate position.

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(d) Establish communication in VHF band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(e) From the outset of the call, make certain that :

(e1) On Selcal control unit, LH (RH) SELCAL indicator light flashes.

(e2) A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(f) On Selcal control unit, press LH (RH) SELCAL indicator light and check that :

- SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

(3) Check SELCAL 1 and SELCAL 2 channels in HF band.

CAUTION : THIS CHECK CAN ONLY BE CARRIED OUT WITH THE ASSISTANCE OF A GROUND RADIO STATION HAVING A SELCAL CODER. THE GROUND RADIO STATION MUST SELECT THE SAME CODE NUMBER AS THAT SELECTED ON THE AIRCRAFT DECODER.

NOTE 1 : The call aural warning generated by the audio warning system may be cancelled by pressing one of the AUDIO CANCEL push-buttons located on panel 4-211.

NOTE 2 : The test described here applies to Selcal operation with HF1 system. For HF2 system, read items given between brackets.

(a) On lower centre console 9-211, on HF dual control unit, on HF1 (HF2) side :

- Select the frequency of the station with which contact is to be established
- Place OFF-AM-SSB function selector switch in AM position. Wait two minutes and continue the test.

(b) On upper centre console 7-211, on Selcal control unit, place :

- LH selector switch in HF1 (VHF1) position
- RH selector switch in VHF2 (HF2) position.

(c) On Captain's audio selector panel :

- Engage HF1 (HF2) key on keyboard ; the key previously engaged disengages.
- Disengage reception push-buttons which could remain engaged.
- Engage HF1 (HF2) reception push-button and place integral potentiometer in intermediate position.

(d) Establish communication in HF band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(e) From the outset of the call, make certain that :

(e1) On Selcal control unit LH (RH) SELCAL indicator light flashes.

(e2) A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(f) On Selcal control unit, press LH (RH) indicator light and check that :

- SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

D. Close-Up

(1) On HF dual control unit, place both OFF-AM-SSB function selector switches in OFF position.

(2) On Captain's audio selector panel :

(a) Disengage HF2 key on keyboard.

(b) Disengage HF reception push-buttons

(3) On Captain's console 1-211 and on First Officer's console 1-212 :

- Place LOUDSPEAKER ON-OFF switch in OFF position.

(4) On Captain's jack panel, disconnect boomset from HEADSET and MIC jacks.

(5) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

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(6) Stop electronics rack ventilation (Ref. 21-21-00).

(7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

3. System Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
2 Boomsets	

B. Prepare

(1) Repeat operations described from paragraph 1. B. (1) to 1. B. (8) inclusive.

(2) On Captain's and First Officer's jack panels :

- Connect boomsets to HEADSET and MIC jacks

C. Test

(1) Test indicator lights

Repeat operations described in Paragraph 1. C. (1).

(2) Check SELCAL 1 (SELCAL 2) channel

CAUTION : THIS CHECK CAN ONLY BE CARRIED OUT WITH THE ASSISTANCE OF A GROUND STATION HAVING A SELCAL CODER. THE GROUND STATION MUST SELECT THE SAME CODE NUMBER AS THAT SELECTED ON THE AIRCRAFT DECODER.

NOTE 1 : The call aural warning generated by the audio warning system may be cancelled by pressing one of the AUDIO CANCEL push-buttons located on panel 4-211.

NOTE 2 : The test described here applies to operation of SELCAL 1 channel with the two VHF and the two HF systems. For test of SELCAL 2 channel, read items given between brackets.

(a) With VHF1 system

(a1) On lower centre console 9-211, on VHF1 control unit, select the frequency of the radio station with which contact is to be established.

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(a2) On Selcal control unit, place :

- LH selector switch in VHF1 (HF2) position
- RH selector switch in HF2 (VHF1) position

(a3) On Captain's (First Officer's) audio selector panel :

- Engage VHF1 key on keyboard
- Engage VHF1 reception push-button and place integral potentiometer in intermediate position.

(a4) Establish communication in VHF band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(a5) From the outset of the call, make certain that :

- On Selcal control unit, LH (RH) SELCAL indicator light flashes
- A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(a6) On Captain's (First Officer's) audio selector panel, place R/T - INT PTT switch in R/T position or on Captain's (Frist Officer's) control column handwheel place RAD - INT PTT switch in RAD position.

- LH (RH) SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

(b) With VHF2 system

(b1) On lower centre console 9-211, on VHF2 control unit, select the frequency of the radio station with which contact is to be be established.

(b2) On Selcal control unit, place :

- LH selector switch in VHF2 (HF2) position
- RH selector switch in HF2 (VHF2) position

(b3) On Captain's (First Officer's) audio selector panel :

- Engage VHF2 key on keyboard ; the key previously engaged disengages
- Disengage VHF1 reception push-button
- Engage VHF 2 reception push-button and place the integral potentiometer in intermediate position.

(b4) Establish communication in VHF band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(b5) From the outset of the call, make certain that :

- On Selcal control unit, LH (RH) SELCAL indicator light flashes
- A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(b6) On Captain's (First Officer's) audio selector panel, place R/T - INT PTT switch in R/T position or on Captain's (First Officer's) control column handwheel place RAD - INT PTT switch in RAD position and check that :

- LH (RH) SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

(c) With HF1 system

(c1) On lower centre console 9-211, on HF dual control unit :

- In HF1 frequency display window, select the frequency of the station with which contact is to be established.
- Place both OFF-AM-SSB function selector switches in AM position.

(c2) On Selcal control unit, place :

- LH selector switch in HF1 (VHF1) position
- RH selector switch in VHF2 (HF1) position

(c3) On Captain's (First Officer's) audio selector panel :

- Engage HF1 key on keyboard ; the key previously engaged disengages.
- Disengage VHF2 reception push-button
- Engage HF1 reception push-button and place the integral potentiometer in intermediate position.

(c4) Establish communication in HF band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(c5) From the outset of the call, make certain that :

- On Selcal control unit, LH (RH) SELCAL indicator light flashes
- A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(c6) On Captain's (First Officer's) audio selector panel, place INT - R/T PTT switch in R/T position or on Captain's (First Officer's) control column handwheel, place RAD - INT PTT switch in RAD position, and check that :

- LH (RH) SELCAL indicator light extinguishes
- The aural signal is no longer heard in audio warning loudspeakers.

(d) With HF2 system

(d1) On lower centre console 9-211, on HF dual control unit :

- In HF2 frequency display window, select the frequency of the station with which contact is to be established.

(d2) On Selcal control unit, place :

- LH selector switch in HF2 (VHF1) position
- RH selector switch in VHF2 (HF2) position.

(d3) On Captain's (First Officer's) audio selector panel :

- Engage HF2 key on keyboard ; the key previously engaged disengages,

- Disengage HF1 reception push-button
- Engage HF2 reception push-button and place the integral potentiometer in intermediate position.

(d4) Establish communication in HF band with the ground radio station to transmit aircraft Selcal code number, then ask for a call.

(d5) From the outset of the call, make certain that :

- On Selcal control unit, LH (RH) SELCAL indicator light flashes,
- A repetitive two-tone aural signal is heard in audio warning loudspeakers.

(d6) On Captain's (First Officer's) audio selector panel, place INT-R/T PTT switch in R/T position or on Captain's (First Officer's) control column handwheel, place RAD-INT PTT switch in RAD position. Check that :

- LH (RH) SELCAL indicator light extinguishes,
- The aural signal is no longer heard in audio warning loudspeakers.

D. Close-Up

(1) On lower centre console 9-211, on HF dual control unit, place function selector switches (HF1 - HF2 system) in OFF position.

(2) On Captain's and First Officer's audio selector panels :
- Disengage last key engaged on keyboard,
- Disengage reception push-button(s) remained engaged.

(3) On Captain's and First Officer's jack panels, disconnect boomsets from HEADSET and MIC jacks.

(4) On Captain's console 1-211 and on First Officer's console 1-212 :

- Place LOUDSPEAKER ON-OFF switch in OFF position.

(5) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob counterclockwise.

(6) Stop electronics rack ventilation (Ref. 21-21-00).

(7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

SELCAL CONTROL UNIT - REMOVAL/INSTALLATION

1. General

Selcal control unit R231 is installed in flight compartment, on forward center console 7-211.

2. Selcal Control Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets if necessary	

B. Prepare

(1) On roof panel 4-211, make certain that CENTRE CONSOLE PANEL is placed in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SELCAL NO1 SUP	15-215	R117	F18
CTR CONSOLE INST LTS SUP	14-216	L405	B 8
SELCAL NO2 SUP	15-216	R118	E13

C. Remove

(1) Refer to 23-00-00, Removal/Installation, paragraph 3.B.

D. Prepare

(1) Refer to 23-00-00, Removal/Installation, paragraph 3.E.

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 3.F.

F. Close-Up

(1) Remove safety clips and tags and reset circuit breakers tripped in paragraph 2.B.(2).

(2) Carry out selcal system operational test (Ref. 23-22-00, Adjustment/Test).

Printed in England

SELCAL DECODER - REMOVAL/INSTALLATION

1. General

SELCAL decoder R111 is installed in RH forward electronics rack on shelf 5-216.

2. Selcal Decoder

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
SELCAL No. 1 SUP	15-215	R117	F18
SELCAL No. 2 SUP	15-216	R118	E13

(2) On RH forward electronics rack, remove panel 216 ES giving access to shelf 5-216.

C. Remove

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.D.

D. Preparation of Replacement Component

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.E.

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.F.

F. Close-Up

Printed in England

(1) Remove safety clips and tags and reset circuit breakers tripped in paragraph 2.B.(1).

(2) Carry out operational test of selcal decoder (23-22-00, Adjustment/Test).

(3) On RH forward electronics rack install panel 216 ES.

PASSENGER ADDRESS AND ENTERTAINMENT - DESCRIPTION AND OPERATION

1. General

This portion of the communications system provides the following to the passengers:
- instructions or announcements from crew members or stewards,
- instructions, announcements or music, all pre-recorded on magnetic tapes,
RB - music pre-recorded on compact discs.
All of these can be distributed by two systems:
- the public address system
- the passenger entertainment system.

2. Description and Operation (Ref. Fig. 001)

A. Public Address System

The public address system broadcasts announcements, instructions or music in loudspeakers installed in passenger compartment, toilets and Stewards' stations.
The system mainly consists of one public address amplifier and one tape reproducer.

(1) Public address amplifier

The public address amplifier:
- through an electronic chime draws passenger attention to call or instruction that follows,
- through a priority sequence enables broadcasting of selected channel.

(a) Electronic chime

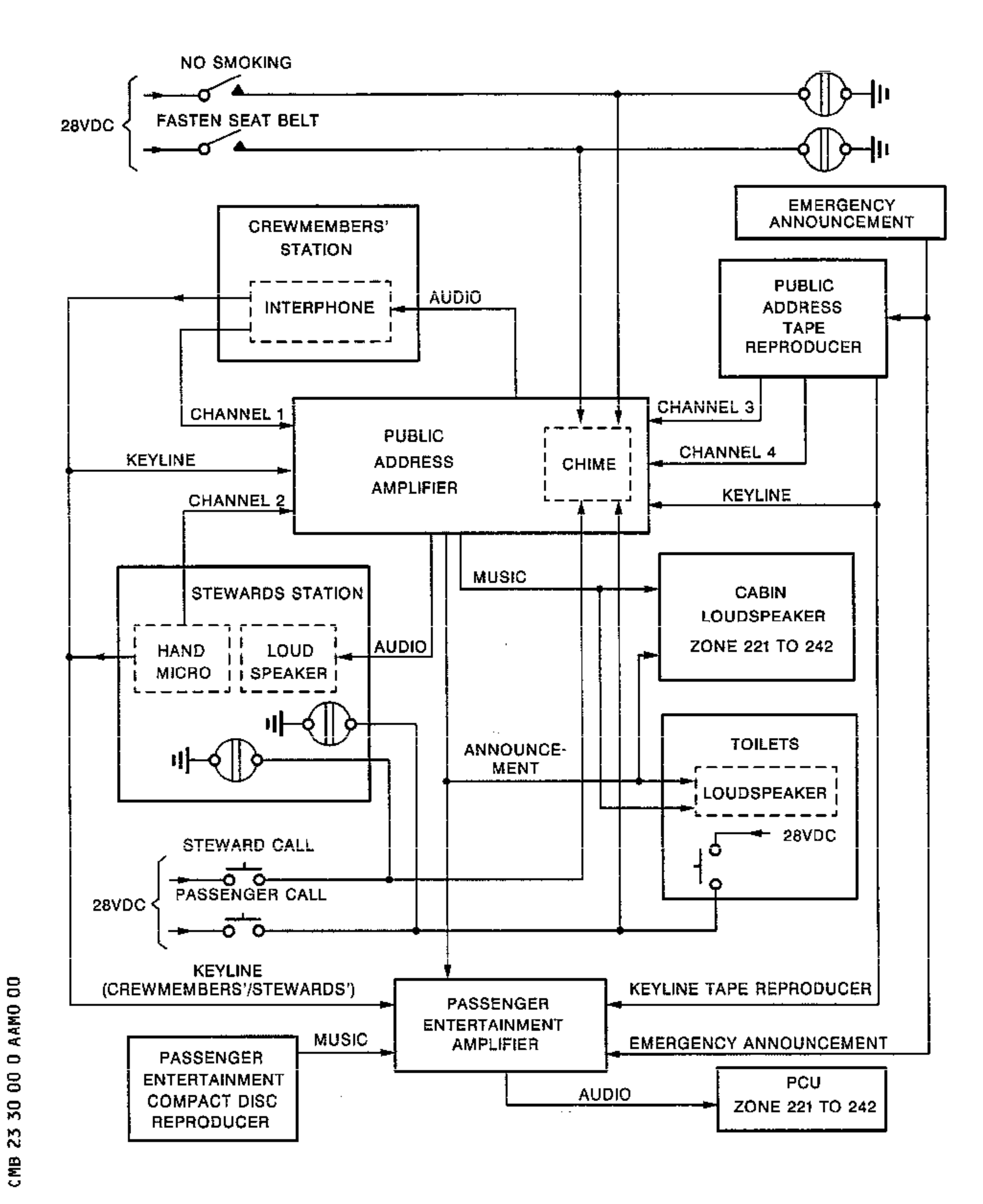
The electronic chime is a two-tone chime having a high (HI) and a low (LO) tone used either separately or combined on the four following channels.

(a1) Channel 1, "Passengers"

This channel is assigned to passengers for calling a Steward (the call activates the HI tone of electronic chime and the associated call light at Stewards' stations).

(a2) Channel 2, "Stewards"

This channel is assigned to crew members for calling a Steward (the call activates the HI-LO tone of electronic chime and the



PRINTED IN ENGLAND

CMB 23 30 00 0 AAM0 00

Passenger Address and Entertainment - Block Diagram
Figure 001

RB

associated call light at Stewards'stations).

(a3) Channel 3, "Belts"

This channel selected by crew members broadcasts "Fasten seat belts" instruction accompanied by the LO tone and illumination of associated passenger signs.

(a4) Channel 4, "No smoking"

This channel selected by crew members broadcasts "no smoking" instruction accompanied by the LO tone and illumination of associated passenger signs.

(b) Priorities

Broadcasting of announcements, instructions or music is achieved via priorities depending on channel selections.

(b1) Priority 1 (channel 1)

This channel has a top priority and is assigned to crew members for broadcasting instructions by engaging PA key on audio selector panel and using associated interphone means.

(b2) Priority 2 (channel 2)

This channel takes priority over tape reproducer channel and is assigned to Stewards for broadcasting announcements using microphone located at Stewards' stations.

(b3) Priority 3 (channel 3)

This channel is tape reproducer channel. It takes priority over music and broadcasts pre-recorded announcements.

(b4) Priority 4 (channel 4)

This channel reproduces pre-recorded music and has no priority over other channels.

(2) Public address tape reproducer

The public address tape reproducer enables reproduction of announcements and music on channels 3 and 4 of public address amplifier via a sequence of priorities.

(a) Priority 1

This input corresponds to emergency announcement triggered by the emergency oxygen services relay and has a top priority over the other two inputs.

(b) Priority 2

This input corresponds to the announcement selected from tape reproducer control unit and takes priority over music.

(c) Priority 3

This input corresponds to background music and has no priority.

B. Passenger Entertainment

The passenger entertainment system allows reception of announcements, instructions and music programs in the
B headsets connected at each passenger seat.
RB This system includes one amplifier, one compact disc reproducer and individual passenger control units.

(1) Passenger entertainment amplifier

The passenger entertainment amplifier receives:
- pre-recorded music programmes from passenger
RB entertainment compact disc reproducer
- announcement and instruction signals from public address system

(a) Music programme

RB The passenger entertainment compact disc reproducer music programme is applied to passenger entertainment amplifier provided no keyline is
B energized, and then directed to individual headsets.

(b) Announcements

The announcements or instructions from public address system take priority over the music programme which is inhibited in the following conditions:

(b1) Energization of microphone keyline by crew members or Stewards.

(b2) Energization of keyline circuit by public address tape reproducer announcement keyline.

(b3) Appliance of emergency announcement by the emergency oxygen services relay.

Music programme is resumed at the end of the announcement.

RB (2) Passenger entertainment compact disc reproducer.

RB The passenger entertainment compact disc reproducer supplies monaural and stereophonic music programmes to the amplifier. Music channels are arranged by the airlines to vary the programmes according to their flights.

(3) Passenger Control Unit

One passenger control unit is installed in the armrest of each passenger seat.
Each control unit features:
- one programme selector
- one volume control selector
- socket for connection of headsets. B

PUBLIC ADDRESS - DESCRIPTION AND OPERATION

1. General

The Public Address (PA) system broadcasts announcements and instructions to the passengers as well as musical programs prerecorded on a magnetic tape reproducer.

RB At speeds above Mach 1, the high ambient noise in the cabin
RB effects clarity of crew speech over the Public Address System.
RB To overcome this problem an automatic volume increase has been
RB introduced to improve the speech intelligibility.

2. System Components

- One public address amplifier R137
- Three microphones R146 - R151 - R158 (at stewards' stations)
- Three loudspeakers R150 - R154 - R156 (at stewards' stations)
- Three loudspeakers in toilets (L981 - L983 L984)

  NOTE: One loudspeaker L982 is installed when a fourth toilet (toilet 3A) is installed.

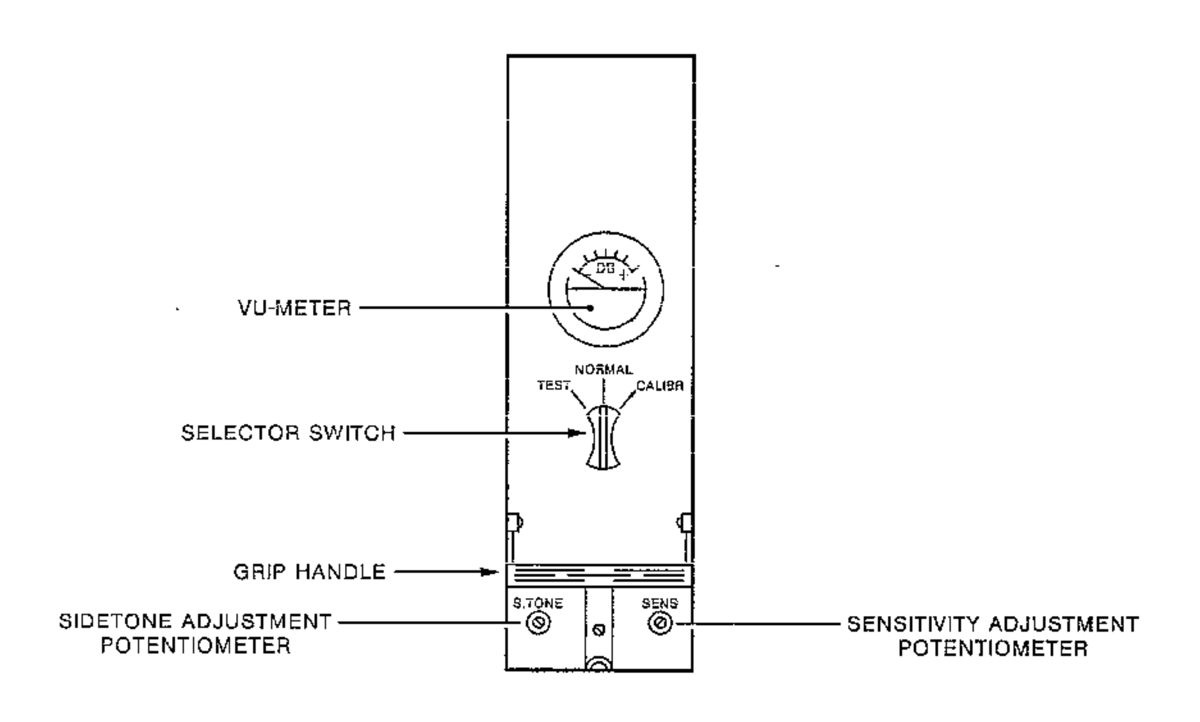
- Forty three loudspeakers in the cabin
- Three loudspeakers transformers (toilets). One additional transformer is installed when loudspeaker L982 is installed.
- Forty three loudspeaker transformers in the cabin
- One VOLUME potentiometer (R152)
- One SENSITIVITY potentiometer (R153)
- One tape reproducer R245
- One tape reproducer ON-OFF switch R249
- One tape reproducer control unit R146 (at forward stewards' station)
- One tape reproducer volume potentiometer R250.

3. Amplifier TEAM AS 1234 - Public Address

A. Description (Ref. Fig. 001)

(1) Mechanical characteristics

The amplifier takes the form of a rectangular case. Its weight is 10.20 lb (4.630 kg).



Public Address Amplifier : Front View
Figure 001

(a) The front panel carries:

- One VU-meter, which allows to read the output level of audio frequency signals.

- One three-position selector switch, marked TEST-NORMAL-CALBR, which allows to check loudspeaker operation and output level adjustment.

- One grip handle

- Two adjustment potentiometers, which are to be operated by means of a screwdriver:
  - The SENS potentiometer, providing adjustment of the pre-amplifier gain
  - the S.TONE potentiometer, providing adjustment of the 60 W amplifier Sidetone output level

- One locking tab for securing the amplifier to its base.

(b) On the rear panel, a connector allows connection of the amplifier to the aircraft electrical network.

(2) Electrical characteristics

The public address amplifier is completely transistorized. It allows broadcasting of announcements and instructions to the passengers as well as pre- recorded music programs on a magnetic tape reproducer.

Power supply	28VDC
Current drawn	8 AMP
Two asymmetrical inputs	Impedance : 150 ohms
Three symmetrical inputs	Impedance : 600 ohms
Output for passenger compartment loudspeakers	60W (70.7V - 83 ohms)
Output for stewards' loudspeakers	5W/6 ohms
Output for Sidetone	50mW/600 ohms

B. Operation (Ref. Fig. 002)

(1) Input circuits

The public address amplifier input circuit is provided with five channels :

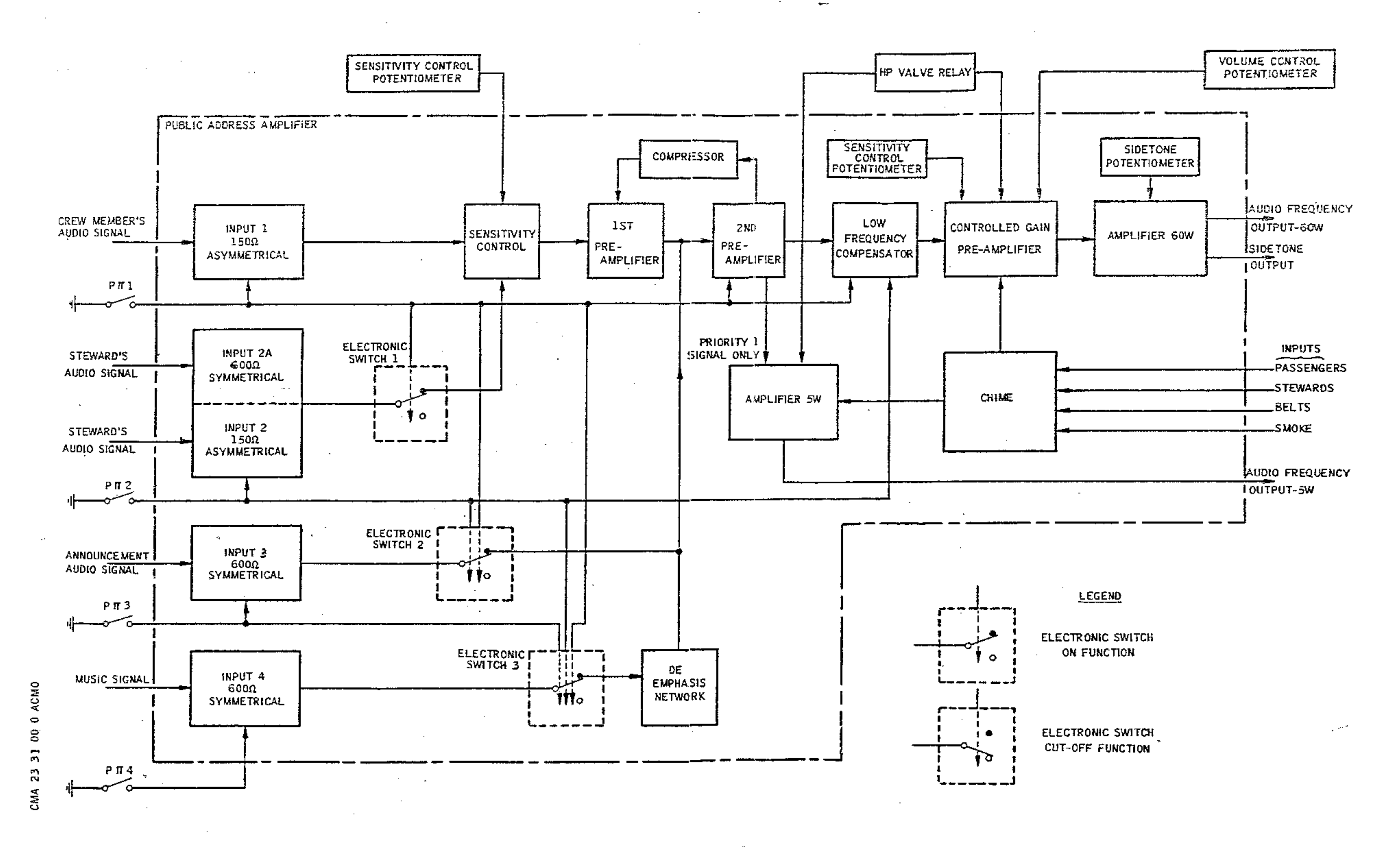
- one channel for crew requirements
- two channels for stewards' requirements
- one channel for announcements
- one channel for music

These channels are controlled from four stations and each station is assigned a rank of priority.
The application of priorities is electronically achieved in such a way that switching on a particular channel input results in automatically switching off the input of any other channel with a lower priority.

(a) Input 1 (Channel 1, priority 1)

Input 1 is assigned to the crew station and controlled by means of the interphone system. It is a 150 ohms asymmetrical input.
The audio signal from the microphone is applied to channel 1 stage input.
When PTT switch 1 is engaged, the pre-amplifier transistor conducts, thus transmitting the audio signal to the amplifier circuit.

INTENTIONALLY BLANK



Public Address Amplifier : Block Diagram
Figure 002

NOTE : This channel is given the benefit of a top priority.

(b) Inputs 2 and 2A (Channels 2 and 2A, priority 2)

Inputs 2 and 2A are assigned to the steward's stations. Input 2 has a 150 ohm asymmetrical impedance; input 2A has a 600 ohm symmetrical impedance.
The audio signal from the microphone, directed to either one of these two channels, is applied to the relevant stage.
When PTT switch 2 is engaged, the pre-amplifier transistor conducts, thus transmitting the audio signal to the amplifier circuit.
If PTT switches 1 and 2 are operated simultaneously, audio input 1 only is connected to the amplifier circuit.
The PTT1 signal is applied to electronic switch 1, which is in cut-off position, thus inhibiting transmission of audio signal 2 or 2A to the amplifier circuit.

NOTE : When the three-position selector switch is placed in the TEST position, a 587 Hz signal, generated by the chime oscillator, is applied to input 1 stage.

(c) Input 3 (Channel 3, priority 3)

Input 3 is assigned to the pre-recorded announcement broadcasting network. It is a 600 ohm impedance symmetrical input.
The announcement audio signal fed by the tape reproducer is applied to the input of channel 3 stage. When PTT switch 3 is engaged, the pre-amplifier transistor conducts, thus transmitting the announcement signal to the second pre-amplifier of the amplifier circuit. If PTT switch 1 or 2 is operated simultaneously with PTT switch 3, electronic switch 2 is in cut-off position, thus inhibiting transmission of audio signal 3 of the amplifier circuit.
Nevertheless, the audio signal 1 or 2 is applied to the amplifier circuit according to the priority sequence.

(d) Input 4 (Channel 4, priority 4)

Input 4 is assigned to the pre-recorded music broadcasting network. It is a 600 ohm impedance symmetrical input.

The audio frequency music signal fed by the tape reproducer is applied to the input of channel 4 stage. When PTT switch 4 is engaged, the pre-amplifier transistor conducts, thus transmitting the audio frequency music signal to the de-emphasis network, which applies the corrected signal to the second pre-amplifier of the amplifier circuit.
If PTT switch 1, 2 or 3 is engaged simultaneously with PTT switch 4, electronic switch 3 is in cut-off position, thus inhibiting transmission of audio signal 4 to the amplifier circuit. Nevertheless, the audio signal in channels 1, 2 or 3 is applied to the amplifier circuit according to the priority sequence.

(2) Amplifier circuit

(a) Sensitivity control, pre-amplifier and low frequency compensator.

Input 1, 2 and 2A audio frequency signals are applied to the sensitivity control stage, which adjusts their level to a nominal value. An external sensitivity potentiometer allows to adjust the level to this value.
Audio frequency signals from the output of the sensitivity control stage are applied to the first pre-amplifier.
The second pre-amplifier is fed, on the same input, by the audio frequency signals from the pre-amplifier or the signals from inputs 3 and 4.
These signals are amplified at a definite gain value. The first pre-amplifier also provides isolation of inputs 3 and 4 audio frequency signals from inputs 1 and 2, which are the sole inputs submitted to the action of the compressor.

After being amplified through the second pre-amplifier :

- Inputs 1 and 2 signals are fed to a compressor, which limits the output level when the signal level at the input of the first pre-amplifier is greater than the nominal sensitivity value.

- Input 1 signal is fed to the 5W amplifier when PTT switch 1 is engaged.

- Audio frequency signals from the pre-amplifier are attenuated in the lower frequency band, from a threshold which is established when PTT switch 1 or 2 is engaged.

- From the compensator output, the audio frequency signals are fed to a controlled gain pre-amplifier.

(b) Controlled gain pre-amplifier and 60W amplifier

The controlled gain pre-amplifier is fed by the signals from the low frequency compensator.
The SENS potentiometer on the front panel allows to adjust the threshold of the signal applied by the compensator or the chime.
This attenuated signal is fed to the pre-amplifier, which applies it to the 60W power amplifier.
Attentuation by means of an external contact (e.g. HP valve relay) is obtained by switching off one stage of the pre-amplifier, which results in pre-amplifier, thereby reducing the 60W power amplifier gain.
An external volume potentiometer allows adjustment of pre-amplifier gain, thus adjusting 60W amplifier input.
The audio frequency signal from the controlled gain pre-amplifier is applied to a driver stage and then to the power stage.
The push-pull power stage feeds the amplified signal to the primary winding of a transformer, the secondary winding of which supplies :

- A 70.7 VAC power on an 83 ohm impedance (= 60W)
- An 11 VAC power, which may be adjusted by means of the SIDETONE potentiometer on the front panel so as to obtain a 50 mW level value on a 600 ohm impedance.
- A feedback voltage fed to the driver stages.

(c) 5W amplifier

The audio frequency signal (input 1 only) from the second pre-amplifier is applied to one input of the 5W amplifier.
The signal is first pre-amplified, and then amplified by means of a push-pull stage, which supplies a 5W power on a 6 ohm impedance.
Attenuation, through external contacts (e.g. HP valve relay) is provided by switching off a feedback stage, which allows the amplifier to operate with two sensitivity levels :

- When the feedback stage is operating normally, the amplifier output power is 5 Watts.
- When the feedback stage is off the amplifier

output power is 1.25 Watts.

The HI and LO chime signals are respectively applied to one input of the 5W amplifier and then to the pre-amplifier, which also operates as a separator for chime signals and output 1 signal.

(3) Electronic Chime

The electronic chime generates three different tones, from two audio frequency oscillators.
Utilizers are provided with four inputs :

- Input 1 - PASSENGERS : HI tone (587 Hz)
- Input 2 - STEWARDS : HI-LO tone (587 and 494 Hz)
- Input 3 - BELTS : LO tone (494 Hz)
- Input 4 - SMOKE : LO tone (494 Hz)

All four inputs cause the chime to operate when the control signal is initiated; only inputs 3 and 4, which give the same tone (LO), operate the chime also at the signal cut-off.
The chime supplies :
- The 5W amplifier, by means of direct coupling
- The 60W amplifier, through the controlled gain pre-amplifier stage and a selective distribution device.

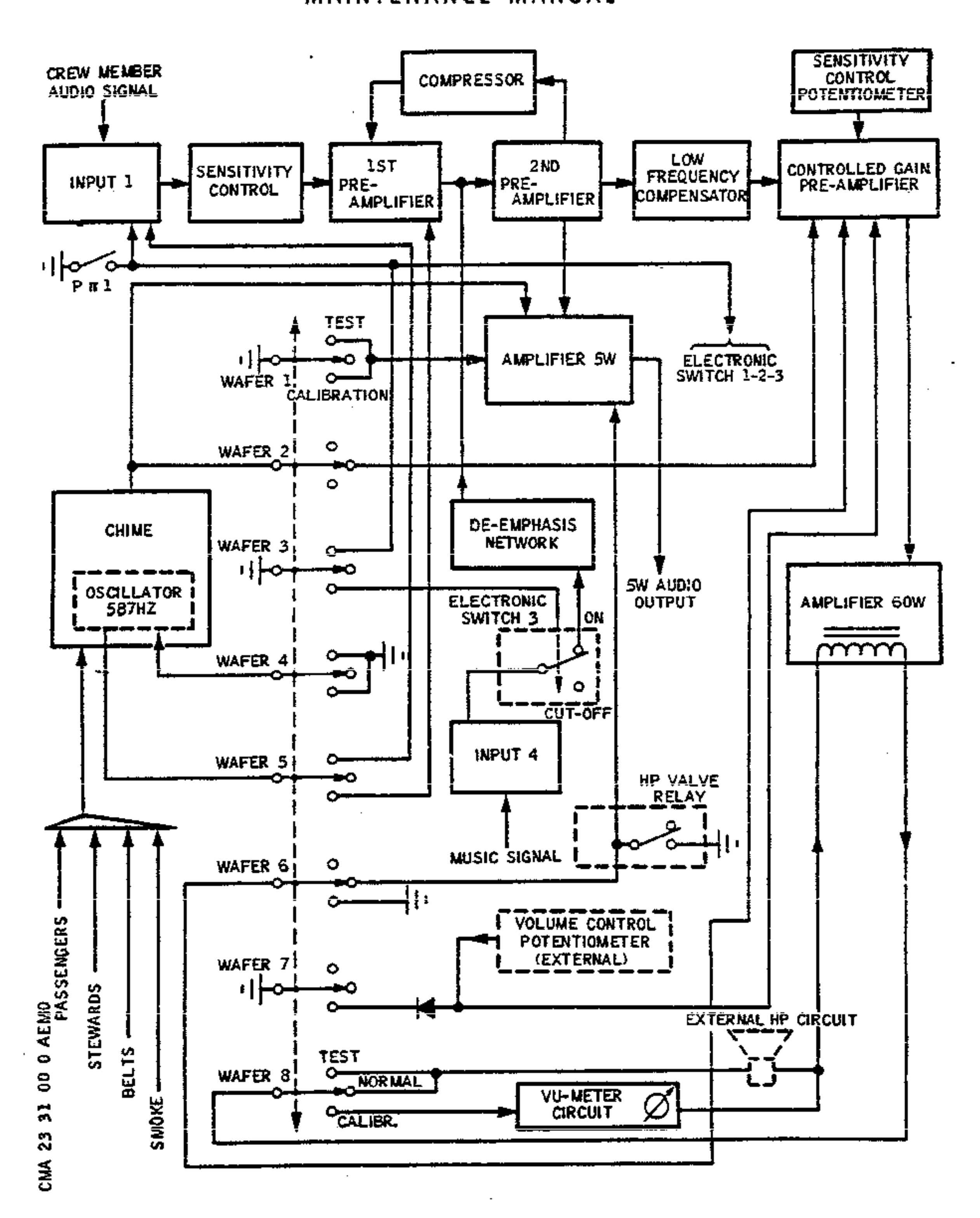
The selective distribution of chime outputs may be achieved by means of a set of straps; combinations are as follows :
- Cancellation of the HI tone (Passengers) by eliminating the strap between the first two DEACTIV HI terminals,

- Cancellation of the HI-LO tone (Stewards) by eliminating the strap between the first two DEACTIV HI-LO terminals,

- Cancellation of the LO tone (Steward) by connecting to the ground the last DEACTIV HI and DEACTIV LO terminals.

NOTE : The 5W amplifier is always fed by the HI, HI-LO and LO signals, whatever the combination used for the 60W amplifier may be.

(4) TEST-NORMAL-CALIBR selector switch (Ref. Fig. 003)



Public Address Amplifier : Block Diagram
with Selector Switch
Figure 003

This three-position switch is located on the amplifier front panel and comprises eight wafers. It allows to check the amplifier for correct operation.

(a) NORMAL position

In normal operation, the selector switch is placed in the NORMAL position.
When PTT switch 1 is pressed, inputs 2, 3 and 4 are blocked (electronic switches 1, 2 and 3 are in cut-off position).
The audio frequency signal is fed to input 1 and then applied to the amplifier circuit.
Wafer 6 provides adjustment of gain in the controlled gain pre-amplifier and in the 5W amplifier according to position of external contact (e.g. HP valve relay).
- With contact disconnected : maximum gain
- With contact connected to ground : minimum gain

Wafer 7 provides adjustment of gain in the controlled gain pre-amplifier by means of external volume potentiometer.
Wafer 8 connects the loudspeakers used in conjunction with the 60W amplifier.
According to oscillator involved, when the SMOKE, BELT, STEWARD OR PASSENGER control is engaged, the chime supplies the HI or LO tone directly to the 5W amplifier and, through wafer 2 and the controlled gain pre-amplifier to the 60W amplifier.
The 5W and 60W amplifiers then feed the chime signal to their respective circuits.

(b) TEST position

Unless maintained in TEST position, the selector switch automatically returns to NORMAL position.
A ground applied by wafer 4 operates constantly the chime 587 Hz oscillator. The 587 Hz test signal is fed to input 1 stage by means of wafer 5. A ground applied by wafer 3 (same role as PTT switch 1) enables the test signal from input 1 to be fed to the amplifier circuit while the other inputs are blocked (electronic switch 1, 2 and 3 are in cut-off position).
The chime signal is no longer operative :
- in 5W amplifier by grounding of signal inputs through wafer 1
- in 60W amplifier via the controlled gain pre-amplifier which no longer receives the signal through wafer 2.

During the test, the controlled gain pre-amplifier is maintained to a maximum gain value by disconnection of HP valve relay contact through wafer 6.

NOTE: The gain of the 5 W amplifier depends on the position of the HP valve relay contact.

Wafer 7 retains the possibility to use external volume potentiometer to adjust the gain of the controlled gain pre-amplifier, thus adjusting the 60 W amplifier gain.
The 587 Hz test signal, processed by the 60 W amplifier is fed to the loudspeakers through wafer 8.

(c) CALIBR position

In this position, a ground applied by wafer 4 operates constantly the chime 587 Hz oscillator. The 587 Hz signal is fed to the first pre-amplifier through wafer 5.
MUSIC input 4 becomes inoperative by grounding of wafer 4.
The chime signal is no longer operative:

- in 5 W amplifier by grounding of signal inputs through wafer 1.
- in 60 W amplifier via the controlled gain pre-amplifier which no longer receives the signal through wafer 2.

The controlled gain pre-amplifier generates a minimum gain through grounding of wafers 6 and 7.

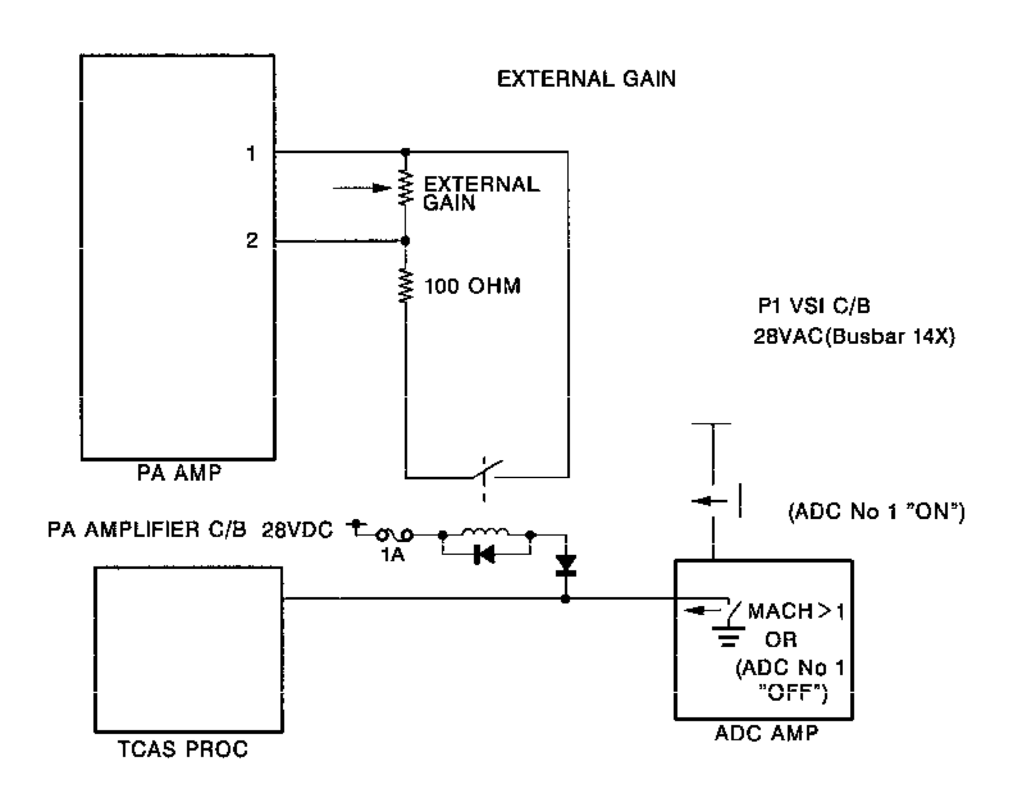
NOTE: The gain of the 5 W amplifier depends on the position of the HP valve relay contact.

The 587 Hz test signal is applied to VU-meter circuit through 60 W power amplifier by switching wafer 8.

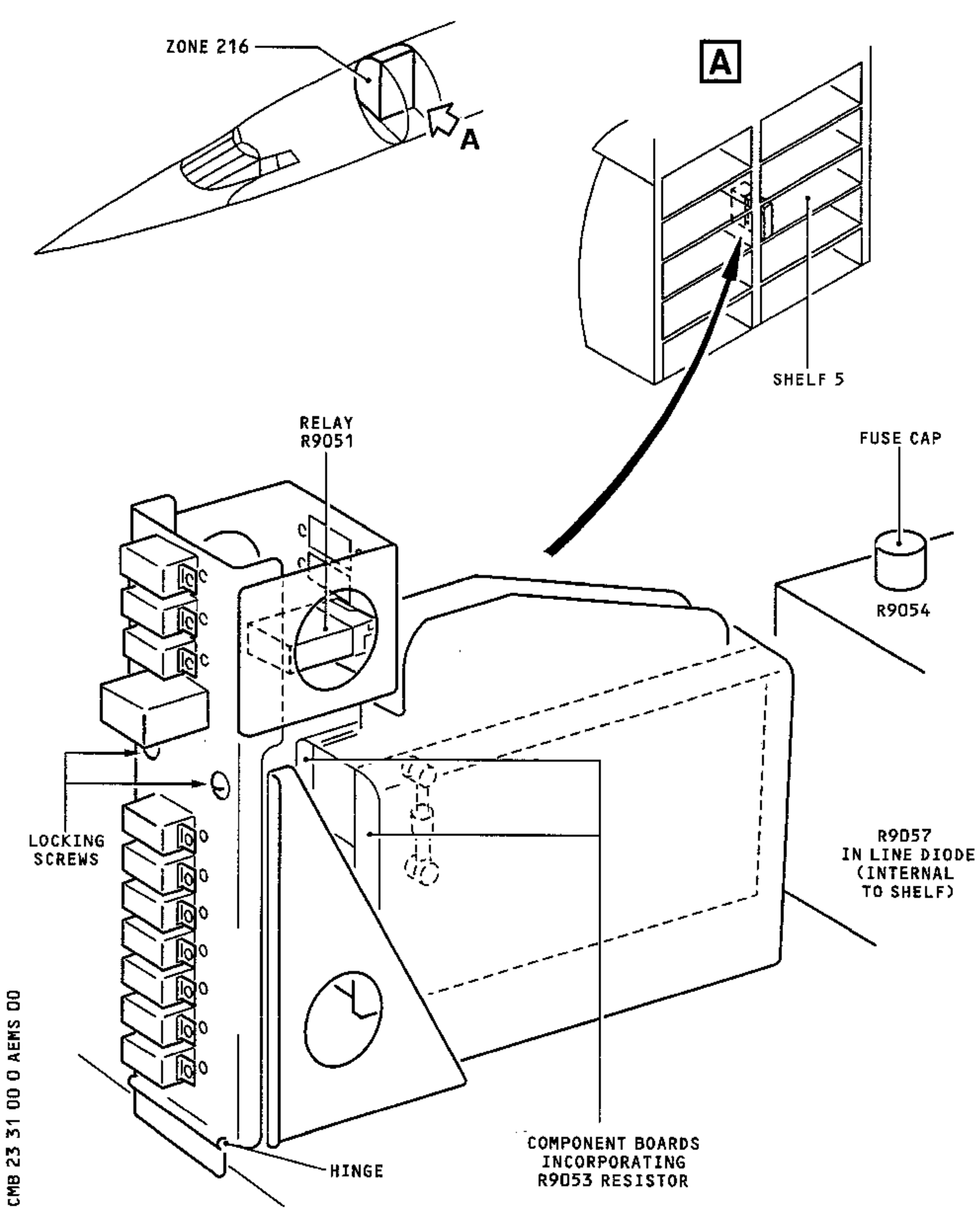
RB C. Automatic Volume Increase above Mach 1 (Ref. Fig. 003A).
RB
RB (1) Automatic volume increase utilises the discrete output
RB from the ADC amplifier at Mach 1. A diode (R9057),
RB 100 ohm resistor (R9053), a relay (R9051) and a
RB 1.0 amp fuse (R9054) is added to the existing circuit.

B The ADC amplifier discrete output is normally open circuit below Mach 1 and grounded above Mach 1. These outputs are applied via the contacts of a 1.0 amp rated relay within the ADC amplifier. The amplifier discrete output is also used to inhibit the TCAS resolution advisor (RA) commands in supersonic flight.

B Below Mach 1, the 28 volt supply on the PA relay is applied to the TCAS processor RA inhibit input. When the aircraft speed reaches Mach 1 the ADC amplifier relay contacts close placing a ground on the TCAS processor RA inhibit line. This ground signal causes the PA relay to be energized, closing its contacts and introducing a 100 ohm resistor in parallel with the external gain potentiometer. The resultant reduction in resistance causes an increase of output power of about 5.0 dBs from the PA amplifier. The 28 volt supply to the relay is protected by a 1.0 amp fuse. The additional components are located on shelf 5-216 (Ref. Fig. 003B).



RB PA Volume Increase
Figure 003A



PA Volume Increase - Shelf 5-216
Figure 003B

4. Reproducer - SUNDSTRAND CAM 202, Magnetic Tape

A. General

The magnetic tape reproducer is a combined announcement and music system designed for use with the aircraft public address system to meet airlines' requirements. This system consists of three major components:

- a magnetic tape reproducer
- a control unit at Stewards' station
- tape magazines (three announcement magazines and one music magazine).

It includes arrival and departure messages, service or emergency information, required announcements or music. Pre-recorded announcements are selected from Stewards' control unit.
A priority sequence for the combined announcement/music system utilization is as follows:

- emergency announcement
- one of the 23 announcements
- background music.

In service, initiation of the emergency announcement is controlled by the automatic release of the oxygen masks in the passenger compartment in the event of decompression or of manual actuation by the crew members.
The emergency announcement takes priority over any other announcement or music. It cannot be cancelled out from the control unit. The audio level of the emergency announcement is higher than other announcements and music levels.
The music program of four hours duration (one hour per track), which is recyclable in automatic position, may be played during passenger boarding, deplaning as well as during flights.
The music program will be interrupted for the duration of any announcement.

B. Description
(Ref. Fig. 004)

(1) Tape Reproducer

(a) Physical Characteristics

The tape reproducer takes the form of a rectangular case of 1/2 ATR length containing tape magazines, tape drive system, playback heads, track selection circuits, detector and amplifier circuits and magazine locks.

(a1) Magazine Locks

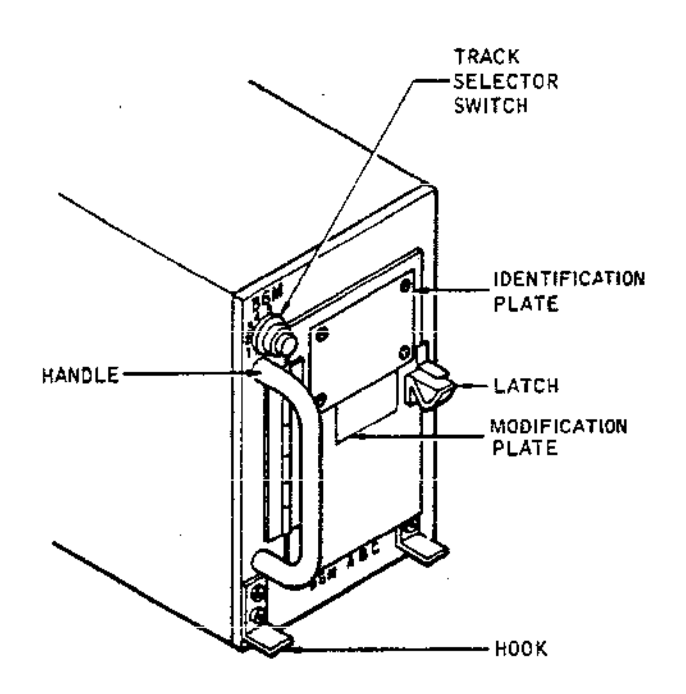
These locks are used to secure the magazines in place in order to avoid any accidental slipping during tape reproducer handling.

(a2) Drive System

(continued on page 15)

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Tape Reproducer CAM202 - Front View
Figure 004

The drive system is controlled by a hysteresis synchronous motor operating at 8000 rpm from a single phase 115 VAC, 400 Hz power supply.
This system includes pulleys, solenoids, shafts and a capstan.
The motor is controlled by an electronic module through a relay located at the rear part of the unit.
The pulleys, shafts and capstan drive the magnetic tape. The reduction system provides a tape speed of 9.5 cm/s (3-3/4 in./s).
The motor is equipped with a quick attach/detach electrical connector to facilitate removal/installation.
Plunger solenoids are used to start and stop the magnetic tapes in the magazines.
When a solenoid is energized, the plunger extends into the tape magazine to actuate a rocker arm assembly and a pinch roller.
The pinch roller presses the tape against the rotating capstan causing the tape to move past the playback heads.

(a3) Detector Assembly

This amplifier stage consists of a detection circuit and 25 Hz transistor filters. Those filters eliminate all audio frequencies except the 25 Hz tone which is amplified and directed to the logic circuit monitoring the audio output.

(b) Electrical Characteristics

Motor power supply	115 VAC, 400 Hz, 20 W
Electronics module power supply	28 VDC, 40 W max.
Frequency response (announce)	50 Hz to 10 KHz
Frequency response (music)	50 Hz to 15 KHz
Total system distortion (recording included)	3% total harmonic distortion
Signal-to-noise ratio	40 db minimum
Wow and flutter	0.4% RMS (0.5 to 200 Hz)
Crosstalk	40 db at 1 KHz at nominal output level
Output impedance	Less than 300 ohms
Output level control	external 10 Kohms potentiometer

(2) Tape magazine

(a) Physical characteristics

Each magazine contains the magnetic tape and the playback system (drive system, playback heads, start/stop microswitch)

(a1) Magnetic tape

The magnetic tape is an endless loop of 4 hours total recording time comprising eight tracks, each of 30 minutes recording time.

(a2) Drive System

The drive system consists of a starting capstan shaft, rocker arm/pinch roller assembly, tape guides, shafts, transmission and tensioning belts to hold the magnetic tape in contact with the playback heads.

(a3) Playback Heads

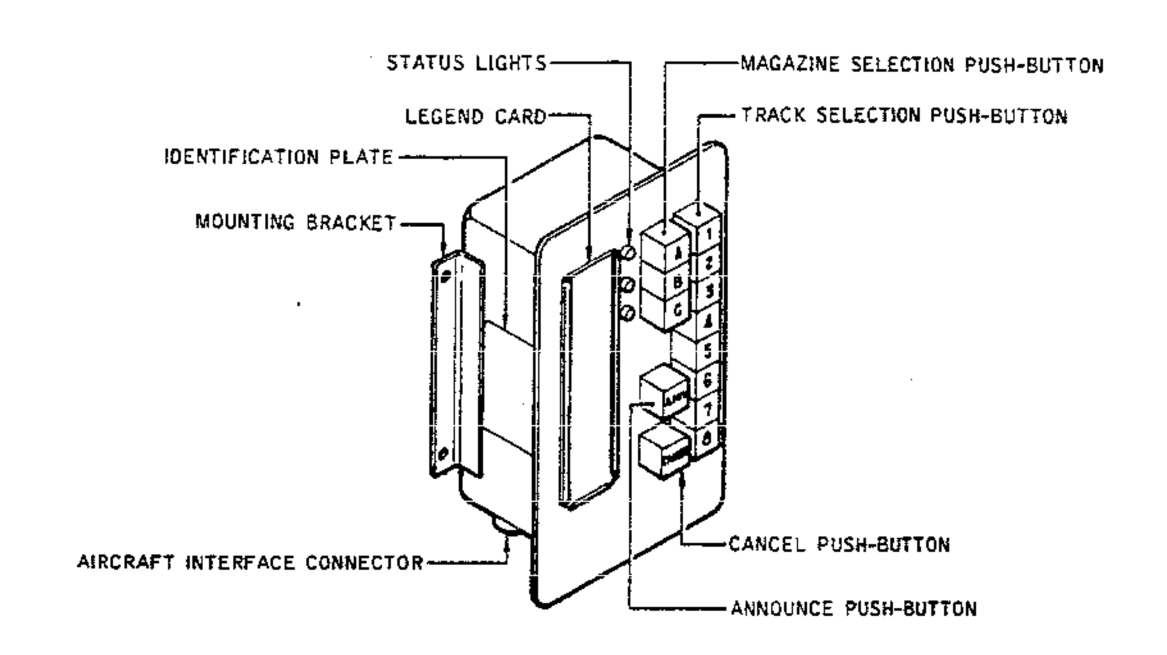
The playback head assembly for the announcement slots contains two 4-track interlaced playback heads for 8-track reproduction.
The playback head assembly for the music slot contains one 4-track head and a sensor assembly used as an automatic track sensing device and for guiding purposes.
The playback heads detect an audio signal proportional to amplitude and frequency of the magnetic field recorded on the tape.

(a4) Background music (BGM) automatic track switching.
This assembly consists of a lamp and a photo-cell sensor mounted adjacent to the playback head.
The photo-cell senses the end of the track by picking up the light through a window in the tape located at the end of the track. This causes the pulse counter and the sequencer circuitry to step to the next track on the tape. When power is applied, track 1 will always be selected first and then will se- sequence through tracks 2, 3 and 4 and return to track 1.

(3) Steward's Control Unit
(Ref. Fig. 005)

The Steward's control unit located at the Steward's station enables selection of announcements contained in tape reproducer CAM202.
Volume controls, external to the control unit, allow control of background music and volume.

The control unit carries :
- Three push-buttons to select magazine A, B or C
- Eight push-buttons numbered 1 to 8 to select the relevant track in tape A, B or C
- One ANN push-button to start the announcements
- One CANCEL push-button to cancel the announcement in progress
- Three status lights to give the position of the tape in magazine A, B or C
- One legend card mentioning the various announcements available.



Steward's Control Unit - Front View
Figure 005

(a) Selection push-buttons

These push-buttons incorporate a light which illuminates the push-button when pressed.
The push-buttons are of the interlock type to avoid simultaneous selection of different tapes or tracks. They allow selection of any one of the 23 announcements.
The emergency announcement is pre-recorded on track 1 of tape magazine A and cannot be selected from the control unit ; it is controlled by the automatic release of the oxygen masks in passenger compartment or manually by the crew members. The emergency announcement cannot be cancelled manually.
An announcement can be selected provided the status light associated with the relevant magazine is extinguished. Selection is possible by pressing push-button A, B or C, one of the push-buttons numbered 1 to 8 and then by pressing ANN push-button.

(b) Status Lights

One status light is located at one side of each magazine selection push-button A, B or C. Those lights must be extinguished to select magazine A, B or C. As soon as an announcement is selected, the status light associated with the selected magazine illuminates, indicating that the tape is moving. Any other announcement recorded on the same tape cannot be selected before complete rewinding of the tape. The end of this operation is visualized by extinction of the status light. The status light is illuminated if the selected announcement magazine is not ready for immediate playback. This may be due to :

- An announcement in progress
- A tape which is not completely started
- A magazine incorrectly positioned in the slot
- No tape in the magazine
- Rewinding of the tape on completion of a previous announcement.

(c) CANCEL push-button

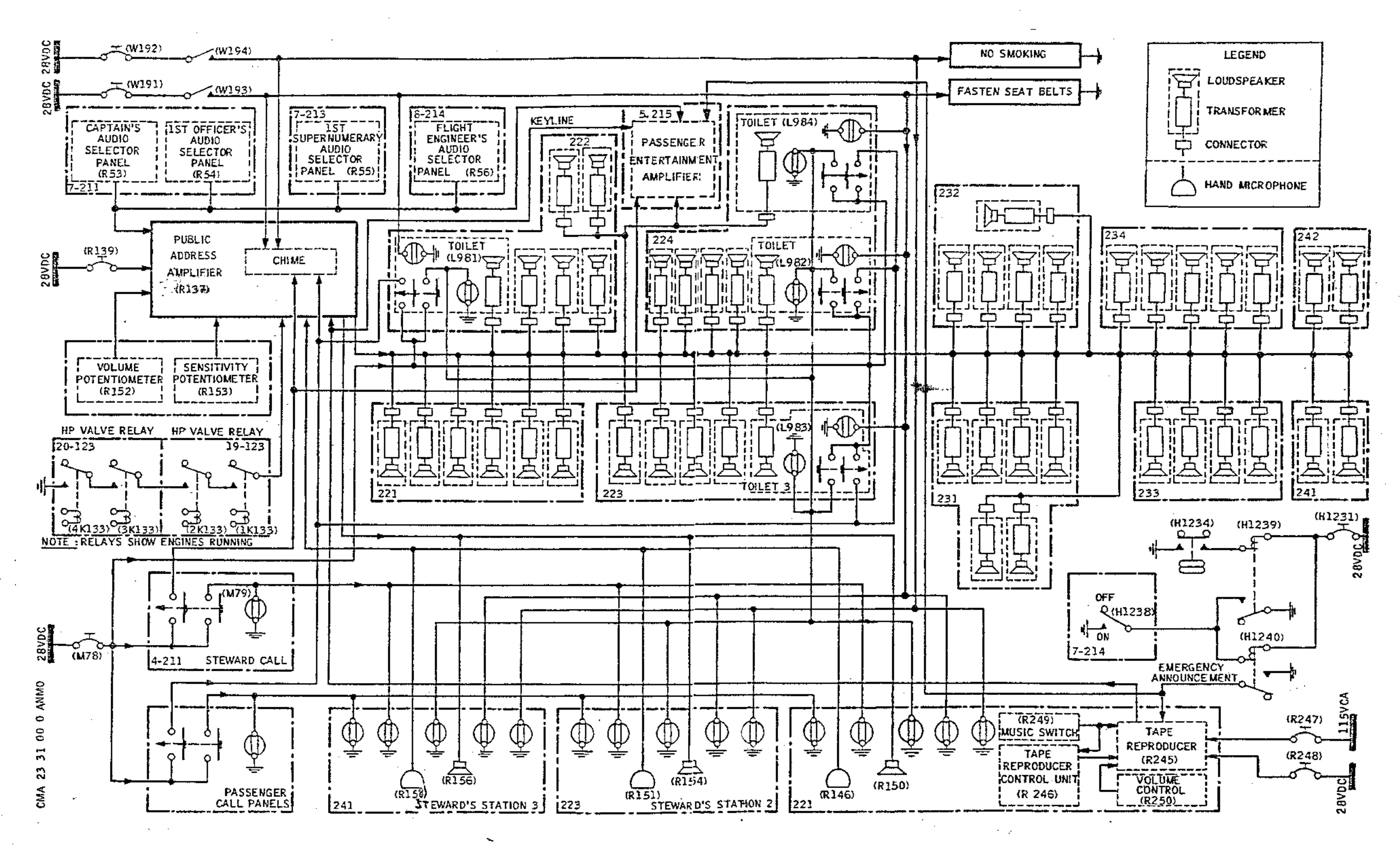
If an undesired announcement has been selected or if a defect appears with the announcement, the announcement can be cancelled by pressing CANCEL push-button.

C. Operation (Ref. Fig. 006)

(1) Tape Reproducer and Steward's Control Unit

When one of the announcements is selected on Steward's control unit by pressing magazine selection push-button A, B or C and one of the track selection push-buttons numbered 1 to 8, this causes a coded message to be directed to the tape reproducer where it is stored in the message selection memory after passing through the control signal buffers. The buffer stage is an intermediate circuit the function of which is to avoid modification of input logic by transient signals. When pressing ANN push-button on control unit, the message selection decoder stage is enabled to decode the message of the selected announcement

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Tape Reproducer System : Block Diagram
Figure 006

This stage transmits a signal to :
- The solenoid controlling the selected tape magazine
- The magazine track selection stage which directs the signal to the magazine output selection stage. This stage also receives signals from the control signal buffer stage and from the message selection decoder stage. It then transmits the selected announcement to the preamplifier stage.

The solenoid stage transmits a status signal concerning the selected tape magazine to the status lights on the control unit. This signal energizes the relay controlling the drive motor.
The motor starts driving the tape.
A 25 Hz signal, recorded on each announcement at a level lower than the normal audio level, is detected by a 25 Hz tone detector which also receives a signal from the preamplifier stage. The 25 Hz tone detector sends a signal to the keyline which allows supply to public address amplifier PTT line and to passenger entertainment if there is no emergency announcement in progress. The volume of the selected announcement is controlled through the preamplifier stage and through the output amplifier stage and then is directed to the public address amplifier. When pressing the CANCEL push-button on the Steward's control unit, a 28VDC signal from the control signal buffer stage is applied to the keyline logic, thereby locking the signal from the 25 Hz detector circuit. The logic circuit then locks the control of the announcement in progress.

(2) Emergency announcement

This announcement of a higher level, has a special circuitry which ensures at any moment a priority over any other announcement or background music.
The emergency announcement is recorded on track 1 of magazine A. As the other announcements recorded in the same magazine are not used during high altitude flights, the possibility of other announcements being in progress in the event of cabin decompression is therefore considerably reduced.
The emergency announcement is not controllable from the Steward's control unit. It is controlled by automatic release of the oxygen masks in the passenger compartment or by manual selection by the crew members. A relay on the emergency circuit is energized and transmits a ground signal to the emergency priority stage.
This stage enables :
- Energization of magazine A solenoid
- Selection and connection of the emergency announcement to the preamplifier.

- Locking of other announcements and music inputs.
- Increase of preamplifier gain by 6 db.
- Supply to public address and passenger entertainment PTT lines.
- Application of the emergency announcement to the public address amplifier through remote volume control and output amplifier stages.

(3) Background Music (BGM)

With ON-OFF switch placed in ON position, a ground signal is applied to the background music automatic track switching stage which also receives a signal from the BGM selector switch.
If there is no announcement in progress, the motor is supplied automatically and drives the tape.
The audio signal from the background music head is directed to the magazine output selection stage then to the amplifier stage. The music audio level is adjusted and the resulting signal is directed to the output amplifier and then to the public address amplifier.
When the BGM selector switch is in position A, automatic track switching is performed through a sequencer circuitry controlled by a lamp and photo-cell sensor placed adjacent to the playback head. The sensor assembly senses the end of the tape by picking up the lamp light through a window located on the tape at the end of each track.

5. Operation
(Ref. Fig. 007)

A. Power Supply

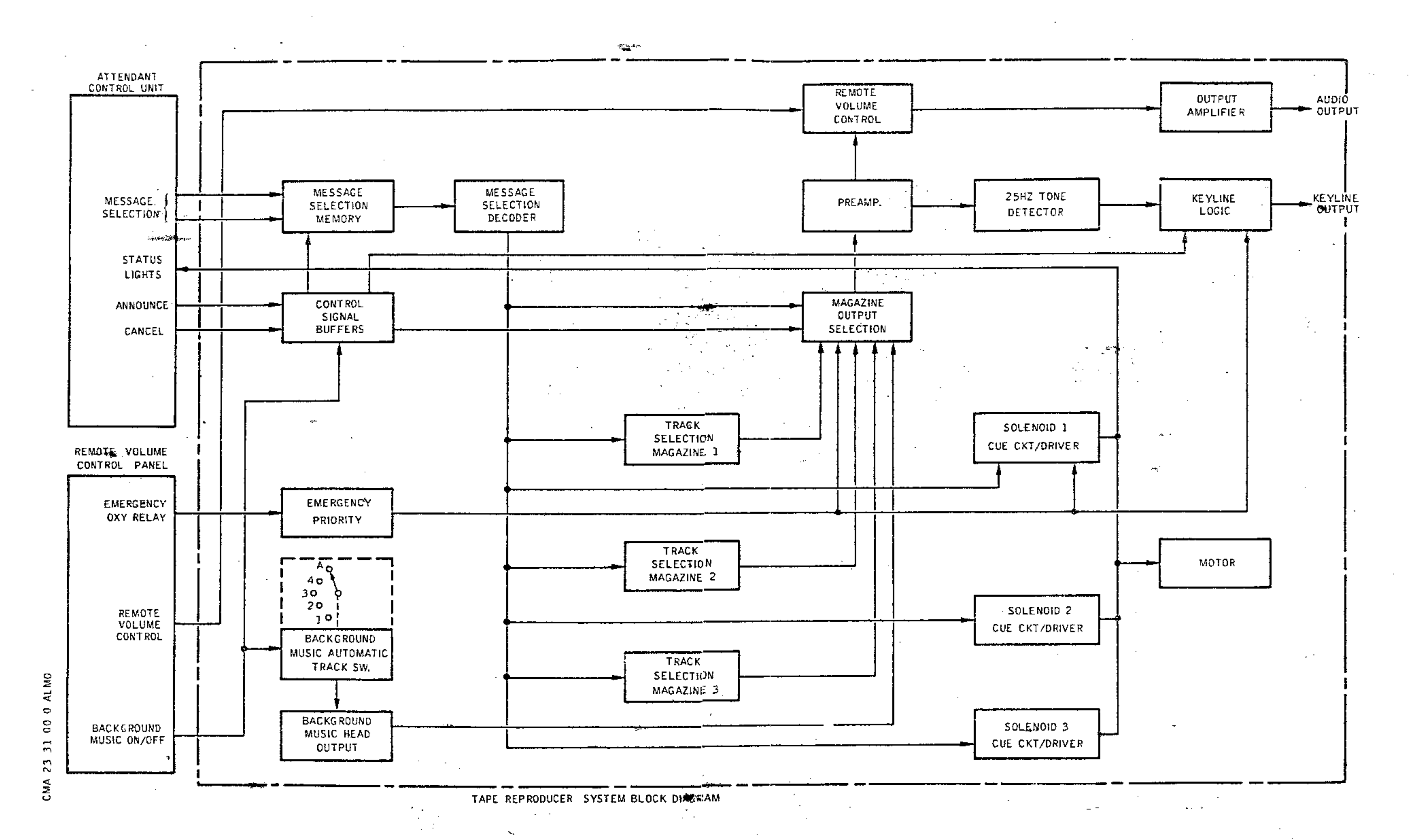
The public address system is supplied with 28VDC power by emergency busbar A through circuit breaker R139.

B. Amplification

The public address amplifier provides a priority sequence as regards the channel selected.
Utilization of one channel results in automatic cut-off of the other channels having a lower priority rank in the priority sequence.

(1) Priority Sequence

(a) Priority 1 (channel 1)



Public Address System : Block Diagram
Figure 007

Only for crew members' use, channel 1 takes absolute priority over other channels. Crew members may transmit announcements to the loudspeakers at Stewards' stations in the cabin and also to individual passenger entertainment headsets by engaging PA key on audio selector panel.

(b) Priority 2 (channel 2)

Only for Stewards' use, channel 2 takes priority over the tape reproducer circuit. The Stewards may transmit announcements to cabin loudspeakers and also to individual passenger entertainment headsets by means of microphones located at each Steward's panel.

(c) Priority 3 (channel 3)

Only for reproducer circuit, channel 3 allows reproduction of pre-recorded announcements and music.

(2) Sensitivity and Attenuation Controls

Metering of sensivity and gain is ensured respectively by two potentiometers R152 and R153.
As soon as one engine starts running, the attenuation circuit is inhibited by means of contacts 1K133 to 4K133 located in the engines.

C. Loudspeaker Attenuation

An attenuation circuit is also provided on loudspeaker circuits as regards their respective locations in the cabin.
- Zones 221, 222, 223, 224, attenuation : -4db
- Zone 231, attenuation : -2db
- Zone 232 : 1 with -4db attenuation and 4 with -2db attenuation
- Zones 233, 234, 241, 242, attenuation : -0db.
- Toilets, zones 222, 223, 224, attenuation : -6db

D. Electronic Chime

The electronic chime is a two-tone chime having a high (HI) and a low (LO) tone.
HI and LO tones may be used separately or be combined in a HI-LO tone on four different channels :
- Channel 1, "passenger", Hi tone
- Channel 2, "stewards'", HI-LO tone
- Channel 3, "belts", LO tone
- Channel 4, "smoke", LO tone.
The electronic chime draws passengers attention before

broadcasting a call or a message.

E. Calls and Instructions

(1) Passenger Call

When the passengers press Steward call indicator lights/switches accessible from their seats or in the toilets, a +28VDC signal is applied to :

- Passenger channel 1 which actuates chime HI tone
- Either FORWARD, CENTRAL or AFT indicator light on Stewards' panels, thus enabling to situate the call.

NOTE : Passenger call is cancelled by pressing again the relevant switch. The call from the toilets is cancelled by pressing the indicator light/ switch on the outer panel of the toilet.

(2) Steward Call

When the crew members press STEWARD CALL indicator light/switch on panel 4-211 in the flight compartment, a +28VDC signal is applied to :

- Steward (attendant) channel 2 which actuates chime HI-LO tone
- FLIGHT DECK CALL caption lights on steward's panels illuminate.

NOTE : The call from the flight compartment is cancelled out by pressing FD CALL CANCEL push-button at one of the Stewards' stations.
When pressing FLIGHT DECK CALL, indicator light/ switch at one of the Stewards' stations, the STEWARD CALL indicator light/switch illuminates.

(3) "Fasten seat belts" Instruction

When FASTEN SEAT BELTS switch (W193) on panel 4-211 is placed in ON position, a +28VDC signal is applied to :

- FASTEN SEAT BELTS channel 3 which actuates chime LO tone.
- The FASTEN SEAT BELTS signs located in the passenger compartment and the indicator light on Stewards' panels which illuminate
- The RETURN TO CABIN sign in the toilets which illuminate.

(4) "No smoking" Instruction

When NO SMKG switch (W194) on panel 4-211 is placed in ON position, a +28VDC is applied to :

- NO SMOKING channel 4 which actuates chime LO tone

- the NO SMOKING signs located in the passenger compartment and the indicator light on Stewards' panels which illuminate.

F. Tape Reproducer

The tape reproducer enables reproduction of announcements and music from a special selection. The tape reproducer includes:
- A number of channels enabling broadcasting of pre-recorded announcements, one channel being especially designed for emergency announcements.
- A background music channel.

Depending on tape reproducer utilization, a priority sequence establishes priorities as follows :
- Priority 1 : emergency announcement
- Priority 2 : general announcements
- Priority 3 : background music

(1) Priority 1

(a) Automatic Actuation

In the event of cabin decompression for an altitude above the determined threshold, the high pressure switch emergency supply aneroid (H1234) activates emergency oxygen services slave relay (H1239) which energizes emergency oxygen services relay (H1240) a function of which switches on tape reproducer emergency announcement priority 1.

(b) Manual Actuation

In manual mode, emergency oxygen services relay (H1240) is controlled by emergency oxygen manual override switch (H1238) which can be actuated by the Flight Engineer (panel 7-214).

(2) Priority 2

Priority 2 corresponds to broadcasting of announcements selected from public address control unit.

(3) Priority 3

Priority 3 corresponds to broadcasting of background music. Music may be played during all flight as well as during passenger boarding and deplaning. The music program will be interrupted for the duration of any announcement.

PUBLIC ADDRESS - DESCRIPTION AND OPERATION

1. General

The Public Address (PA) system, through loudspeakers in the cabin and at Stewards' stations, enable transmission of announcement, instructions and music programs pre-recorded on a tape reproducer.

RB At speeds above Mach 1, the high ambient noise in the cabin effects clarity of crew speech over the PA system. To overcome this problem an automatic volume increase has been introduced to improve the speech intelligibility.

RB A steward speaker muting relay and resistor to reduce the regenerative feed back when the cabin crew are using the microphones has also been introduced.

RB The speaker transformer tappings at the stewards' stations have been altered so as to increase the output volume when the flight crews are using the PA System.

2. System Components

- One public address amplifier R137
- Three microphones R146 - R151 - R158 (at Stewards' stations)
- Three loudspeakers R150 - R154 - R156 (at Stewards' stations)
- Three loudspeaker transformers R144 - R147 - R155 (at Stewards' stations)
- Four loudspeakers in toilets L981 - L983 - L984 - L982
- Forty one loudspeakers in the passenger compartment
- Forty five loudspeaker transformers (passenger compartment and toilets)
- One tape reproducer R245
- One tape reproducer control unit R246 (at forward Stewards' station)

3. Amplifier CABLES G2740 - Public Address

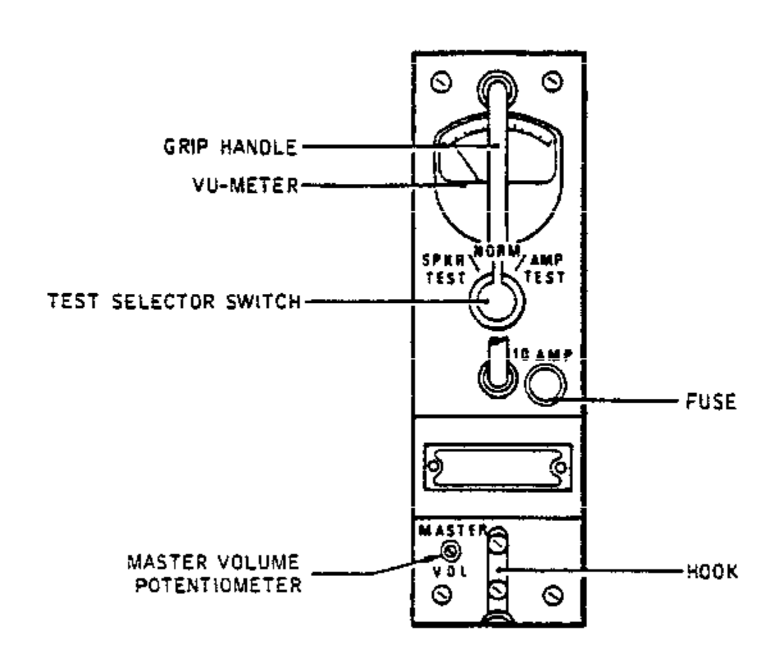
A. Description (Ref. Fig. 001)

(1) Mechanical Characteristics

The amplifier takes the form of a 1/4 ATR short case weighing 4 Kg (8.8 lb).

(a) The front panel carries:

- One VU-meter which allows to read the output level of audio frequency signals.



Public Address Amplifier - Front Panel
Figure 001

- One three position selector switch, marked SPKR-NORM-AMP TEST, which allows to adjust amplifier output level and to check loudspeakers.
- One 10A fuse which protects amplifier power supply.
- One MASTER VOL potentiometer for adjustment of general audio level. Setting of this potentiometer is performed externally by means of a screwdriver. Other setting devices are provided inside the amplifier after removing cover.
- One locking hook to secure amplifier to its base.

(b) The rear panel carries two electrical connectors for connection of the amplifier to the aircraft electrical network.

(2) Electrical Characteristics

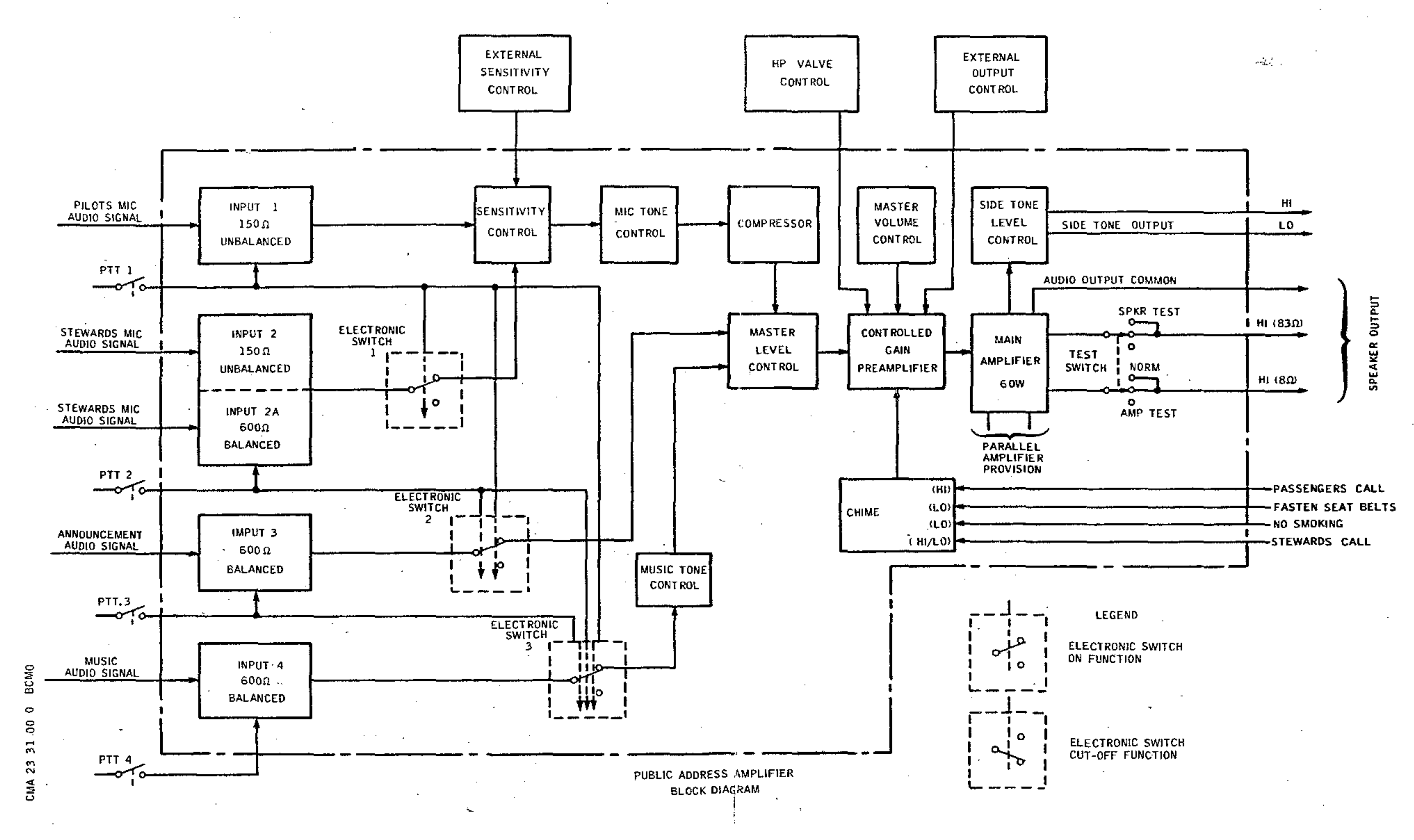
The PA amplifier is completely transistorized. It allows broadcasting of announcements, instructions and music programs pre-recorded on a tape reproducer.

Power Supply	28 V d.c.
Current Drawn	5 A at full load
Two asymmetrical inputs	Impedance : 150 ohms
Three symmetrical inputs	Impedance : 600 ohms
Output for cabin and Stewards' stations loudspeakers	60 W (70.7V-83 ohms)
Sidetone output	50 mW - 600 ohms
Frequency response	Variation less than 3db for all 100 Hz to 5000 Hz inputs.

B. Operation (Ref. Fig. 002)

(continued on page 10)

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Public Address Amplifier - Block Diagram
Figure 002

(1) Input circuits

The public address amplifier input circuits consist of five channels controlled from four different stations.

- Input 1 for crew members
- inputs 2 and 2A for Stewards
- input 3 for annonncements
- input 4 for music.

These inputs are given a rank of priority.
Input 1 takes priority over inputs 2 and 2A.
Inputs 2 and 2A take priority over input 3 and input 3 takes priority over input 4.

(a) Input 1 (channel 1, Priority 1)

Input 1 is assigned to the crew station and controlled by means of the interphone system. It is a 150 ohm asymetrical input.
The audio signal from the microphone is applied to channel 1 stage input.
When PTT switch 1 is engaged, the pre-amplifier transistor conducts, thus transmitting the audio signal to the amplifier circuit.

NOTE : This channel is given the benefit of a top priority.

(b) Inputs 2 and 2A (Channels 2 and 2A, priority 2)

Inputs 2 and 2A are assigned to the Steward's stations. Input 2 has a 150 ohm asymetrical impedance ; input 2A has a 600 ohm symmetrical impedance.
The audio signal from the microphone, directed to either one of these two channels, is applied to the relevant stage.
When PTT switch 2 is engaged, the pre-amplifier transistor conducts, thus transmitting the audio signal to the amplifier circuit.
If PTT switches 1 and 2 are operated simultaneously, audio input 1 only is connected to the amplifier circuit.
The PTT1 signal is applied to electronic switch 1, which is in cut-off position, thus inhibiting transmission of audio signal 2 or 2A to the amplifier circuit.

(c) Input 2 (Channel 3, priority 3)

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Input 3 is assigned to the pre-recorded announcement broadcasting network. It is a 600 ohm impedance symmetrical input.
The announcement audio signal fed by the tape reproducer is applied to the input of channel 3 stage. When PTT switch 3 is engaged, the pre-amplifier transistor conducts, thus transmitting the announcement signal to the amplifier circuit. If PTT switch 1 or 2 is operated simultaneously with PTT switch 3, electrinic switch 2 is in cut-off position, thus inhibiting transmission of audio signal 3 to the amplifier circuit.
Nevertheless, the audio signal 1 or 2 is applied to the amplifier circuit.

(d) Input 4 (Channel 4, priority 4)

Input 4 is assigned to the pre-recorded music broadcasting network. It is a 600 ohm impedance symmetrical input.
The audio frequency music signal fed by the tape reproducer is applied to the input of channel 4 stage. When PTT switch 4 is engaged, the pre-amplifier transistor conducts, thus transmitting the audio frequency music signal to the de-emphasis network, which applies the corrected signal to the second pre-amplifier of the amplifier circuit.
If PTT switch 1, 2 or 3 is engaged simultaneously with PTT switch 4, electronic switch 3 is in cut-off position, thus inhibiting transmission of audio signal 4 to the amplifier circuit. Nevertheless, the audio signal in channels 1, 2 or 3 is applied to the amplifier circuit according to the priority sequence.

(2) Amplifier circuit

(a) Sensitivity and tone controls, low frequency compensator and compressor.

Input 1, 2 and 2A audio frequency signals are applied to the sensitivity control stage, which adjusts their level to a nominal value. An external sensitivity control potentiometer allows to adjust this value as a function of the various types of microphones which could be used on aircraft.
The audio frequency signals from the sensitivity control stage are directed to the tone control stage where they are attenuated to a pre-set threshold. These audio frequency signals are then

applied to the compressor stage which limits the output level when the input signal is higher than the sensitivity nominal value.
The signals are finally applied to the controlled gain pre-amplifier.
The audio frequency signals from inputs 3 and 4 are applied to controlled gain pre-amplifier without passing through the compressor stage.
The signals from input 4 (music channel) first are applied to a tone control stage.

(b) Controlled gain pre-amplifier and 60W main amplifier.

The controlled gain pre-amplifier is fed with signals from input 1, 2, 2A, 3 or 4 and also with signals fron the chime.
A master volume control potentiometer located on the amplifier front panel enables adjustment of signal threshold for that stage.
The audio frequency signal from the controlled gain pre-amplifier is applied to the driver stage and then to the main amplifier.
An external contact (i.e HP valve relay) de-energizes one stage of the pre-amplifier, thereby attenuating the main amplifier output signal.
An external output control potentiometer provides for adjustment of pre-amplifier output level.
The main amplifier with a push-pull power stage, amplifies the signal from the controlled gain pre-amplifier amd applies it to the primary winding of the output transformer, the secondary winding of which supplies :

- a 70.7V output on an 83 ohm impedance (60W)
- a 50 mW output on a 600 ohm impedance (sidetone output)
- a feedback voltage fed to the amplifier driver stage.

(3) Electronic chime

The electronic chime generates various tones to alert the passengers that an announcement or instruction will be broadcast soon.
The chime delivers from audio frequency oscillators the following combination of tones :

B - "Passenger call" input : HI tone (587 Hz) DELETED
B CM42018.
- "Steward call" input : H1-LO tone (587 Hz and 494 Hz)

- "Fasten seat belts" input : LO tone (494 Hz)
- "No smoking" input : LO tone (494 Hz)

All four inputs cause the chime to operate when the control signal is initiated ; only inputs 3 and 4, which give the same note (LO) also operate the chime at the signal cut-off.
The HI and LO frequencies and also the signal level can be adjusted by means of potentiometers located inside the amplifier. The preset signal delivered by the chime and fed to pre-amplifier stage input can be adjusted by means of MASTER VOL control potentiometer located on amplifier front panel. The signal is then applied to the main amplifier.

(4) SPKR TEST-NORM-AMP TEST selector switch (Ref. Fig. 003)

(a) NORM position

The selector switch is placed in NORM position for normal operation. When the PTT switch related to one input is pressed, the audio frequency signal is fed to the controlled gain pre-amplifier and then directed to the 60W main amplifier.
Contacts A6-A8 allow adjustment of the gain of controlled gain pre-amplifier in relation to the position of an external contact (i. e, HP valve relay contact).

- Contact open : maximum gain
- Contact closed : attenuated gain

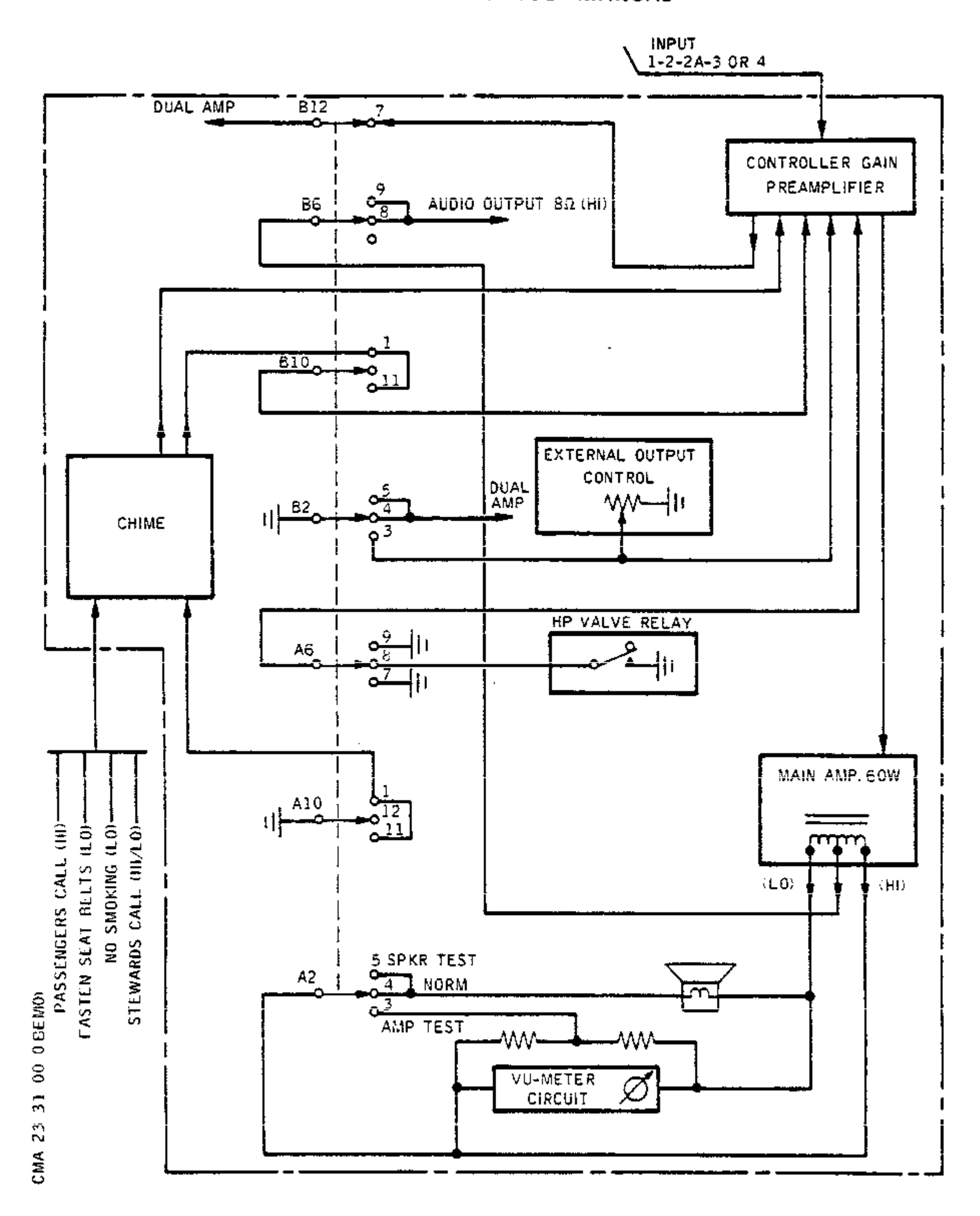
Contacts B2-B3, when open, allow adjustment of the gain of controlled gain amplifier by means of the external output control potentiometer.

Contacts A2-A4 connect the loudspeakers used in conjunction with the 60W main amplifier. The VU-meter circuit becomes operative.

When one of the "Passenger call", "Steward call" "Fasten seat belts" or "No smoking" inputs is triggered, the electronic chime delivers the HI or LO tone directly to the controlled gain pre-amplifier.

(b) SPKR TEST position

During the test the selector switch must be held in this position to avoid automatic reset.



Public Address Amplifier - Test Selector Switch Function
Figure 003

Through contacts A10-A1, the signal is fed to the electronic chime circuit which generates continuously a test audio signal.
Through contacts B10-B1, this test signal is fed to controlled gain pre-amplifier input.
Contacts A6-A8, when open, de-energize HP valve relay function in the circuit.
Through contacts A6-A9, a ground signal is applied to the pre-amplifier, thereby causing attenuation of the gain.
The audio frequency signal at the controlled gain pre-amplifier output is fed to the main amplifier which transmits an amplified audio signal (10 V on 83 ohm impedance) to the loudspeakers through contacts A2-A5.
The external output control potentiometer remains operational as contacts B2-B3 are still open.

(c) AMP TEST position

With the selector switch placed in this position, a ground signal is fed to the electronic chime circuit through contacts A10-A11, thus resulting in a continuous test audio signal.
Through contacts B10-B11, this test signal is fed to the controlled gain pre-amplifier input.
Contacts A6-A8, when open, de-energize HP valve relay function in the circuit.
Through contacts A6-A7, a ground signal is fed to the pre-amplifier, thereby causing an attenuation of the gain. The signal is then applied to the amplifier.
The external output control potentiometer is short-circuited through contacts B2-B3.
Pre-amplifier gain is reduced to minimum.
The test signal at the output of the 60 W main amplifier is fed to the VU-meter circuit through contacts A2-A3.
The cabin loudspeaker circuit is cut-off by opening of contacts A2-A4.

RB C. Automatic Volume Increase above Mach 1 (Ref. Fig. 003A)

RB (1) Automatic volume increase utilizes the discrete output
RB from the ADC amplifier at Mach 1. A diode (R9057),
RB 100 ohm resistor (R9053), a relay (R9051) and a 1.0
RB amp fuse (R9054) are added to the existing circuit.

The ADC amplifier discrete output is normally open circuit below Mach 1 and grounded above Mach 1. These outputs are applied via the contacts of a 1.0 amp rated relay within the ADC amplifier. The amplifier discrete output is also used to inhibit the TCAS Resolution Advisor (RA) commands in supersonic flight.

Below Mach 1, the 28 volt supply on the PA relay is applied to the TCAS processor RA inhibit input. When the aircraft speed reaches Mach 1 the ADC amplifier relay contacts close placing a ground on the TCAS processor RA inhibit line. This ground signal causes the PA relay to be energized, closing its contacts and introducing a 100 ohm resistor in parallel with the external gain potentiometer. The resultant reduction in resistance causes an increase of output power of about 5.0 dBs from the PA amplifier. The 28 volt supply to the relay is protected by a 1.0 amp fuse. The additional components are located on shelf 5-216 (Ref. Fig. 003C).

D. Steward Speaker Muting (Ref. Fig. 003B)

When any one of the stewards' microphones are used, the action of pressing the PTT switch links together pin 5, the microphone low, pin 6 of the PA amplifier and grounds the low terminal of an additional relay coil (R9050) energising the relay. This allows cabin crew speech on the PA speakers and through the passenger entertainment headsets.

The contacts of the relay are so arranged that in the unenergised position the PA signal is fed directly to the Steward speaker transformers. Then in the energised state, the signal is routed to the transformers through a 20.0 Kohm resistor (R9052) which attenuates the signal. The additional diode (R9056) prevents the 28 volt d.c. supply to the relay coil being applied to pin 6 of the PA amplifier and pin 59 of the passenger entertainment amplifier.

The relay 28 volt d.c. supply is protected by a 2.0 amp fuse (R9055). The components are located on shelf 5-216 (Ref. Fig. 003C).

RB E. Steward Speaker Volume Increase

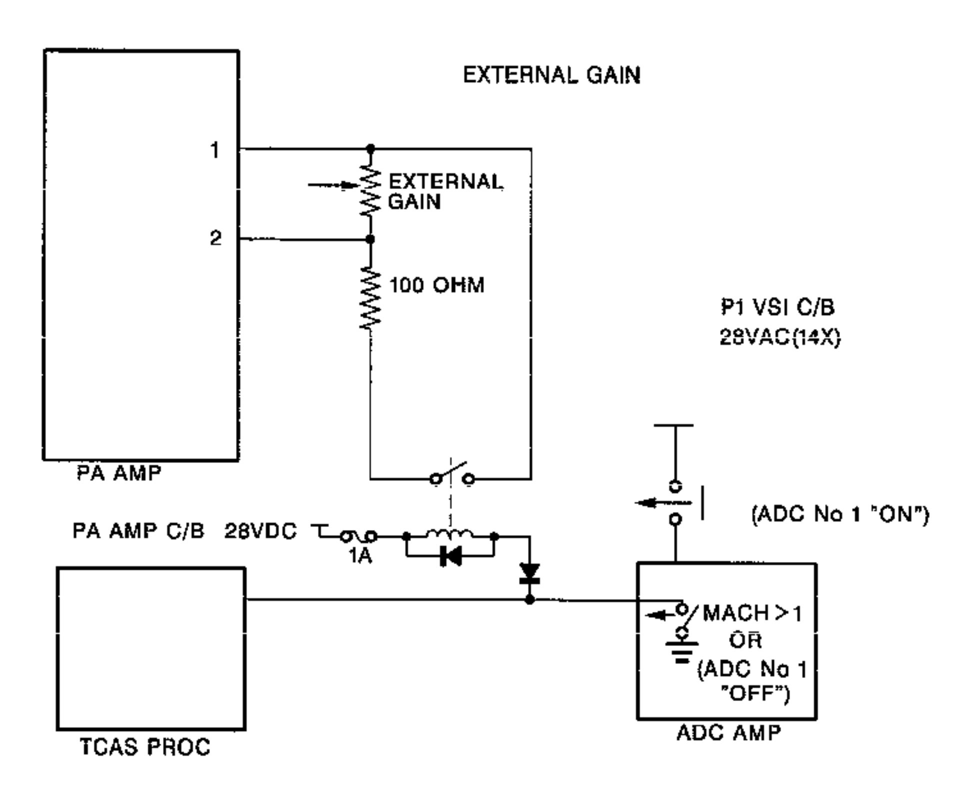
RB During cruise, the volume of the public address system from
RB the Stewards' speakers has been found to be too low. The
RB transformer tappings of the speakers which increases the
RB speaker volume have been altered to read as below.

RB Forward Steward speaker - 4dBs
RB Mid Steward speaker - 2dBs
RB Aft Steward speaker - OdBs.

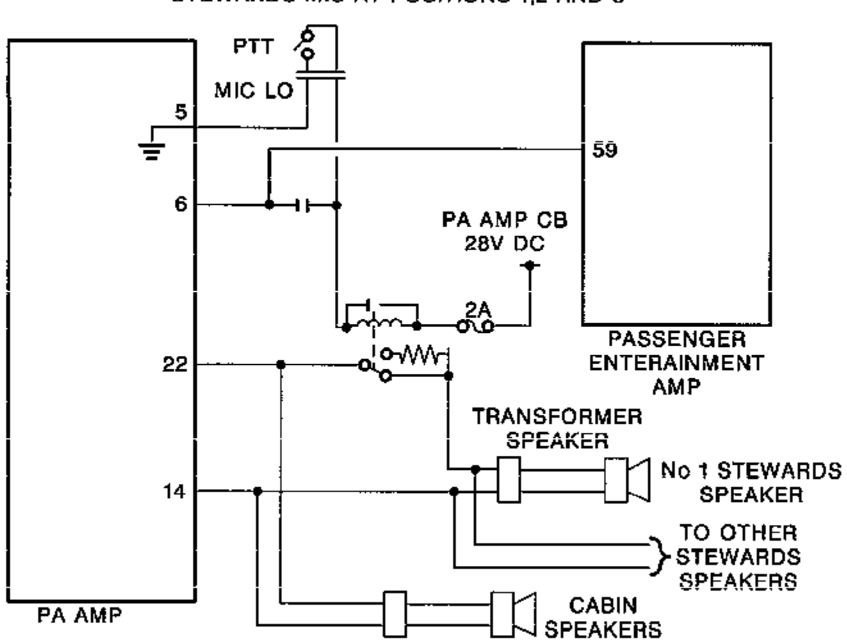
4. Reproducer SUNDSTRAND CAM-1 - Magnetic Tape

A. General

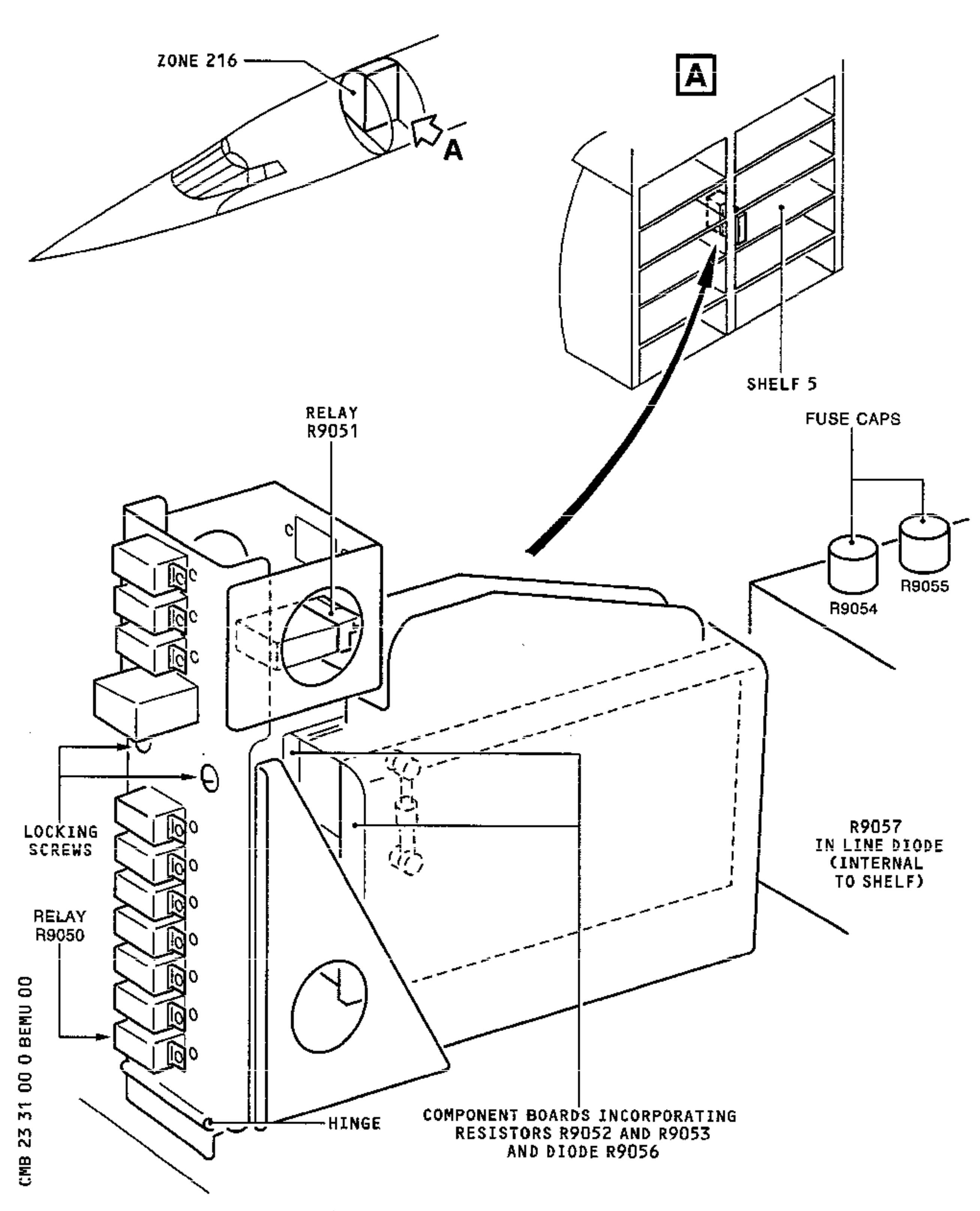
This magnetic tape reproducer is a combined announcement and music system designed for use with aircraft public address system. This system provides twelve pre-recorded announcements and two hours of music.
Typical programming includes arrival and departure messages, service information and required announcements.



PA Volume Increase
Figure 003A



Steward Speaker Muting
Figure 003B



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PA Volume Increase - Shelf 5-216
Figure 003C

Depending upon the user's programming, announcements may be fifteen minutes long.
A priority sequence for the combined announcement/music system utilization is as follows :
- Emergency announcement
- Any of the twelve announcements
- Background music

In service, initiation of the emergency announcement is controlled by the automatic release of the oxygen masks in the passenger compartment in the event of decompression or by manual actuation by the pilot.

The emergency announcement takes priority over any other announcement or music; it cannot be cancelled out from the control unit. The audio level of the emergency announcement is higher than other announcements and music levels.
The music program of a two hours duration may be played during passenger boarding and deplaning as well as during flight. The music program will be interrupted for the duration of any messages.
The tape reproducer system includes :
- A tape reproducer housing five tape magazines
- A control unit

B. Description

(1) Tape Reproducer

(a) Physical characteristics

The tape reproducer is a rectangular box including five tape magazines as well as magazine locks, pre-amplifiers, drive system etc...

(a1) Tape Magazine Locks

Locks are used to hold the tape magazine assemblies in position to prevent accidental slipping during tape reproducer handling.

(a2) Pre-amplifier assembly

The pre-amplifier assembly uses four stages :
- The two first stages provide equalization of the signal for both magnetic head inputs
- The third stage operates into the level-set gain control
- The fourth stage is the output stage connected to a transformer supplying the reception circuit.

(a3) Drive system

The drive system is driven by an 8,000 rpm, single-phase hysteresis motor powered by a 115VAC, 400Hz supply.
A magnetic shield around the motor reduces the 400Hz pick-up by the playback heads in each magazine.
The drive system also includes pulleys, belts, solenoid assemblies and a capstan and shaft assembly.
- The pulleys and the capstan/shaft assembly allow driving of tapes, for a speed of 1.7/8 inch per second (4.8 cm/s), the capstan turns at a nominal speed of 94.54 rpm.
- The belts are small metal conductors used to eliminate static charges.
- Solenoids are used to start and stop the tape in their associated magazines. When a solenoid is energized, the armature pin extends into the magazine to actuate the rocker arm assembly carrying the pinch roller. The roller presses the tape against the rotating capstan to move the tape.

(a4) Relays

Relays are used to transfer from one music track to another. The four playback head outputs are connected to relay inputs, and the relay outputs connect to the pre-amplifier input. The switching of lamp sections is controlled by relay program.

(a5) Rotary stepping switch

This rotary stepping switch is used :
- to select the correct magazine and track for each announcement
- to transfer the appropriate audio frequency announcement through a lumistor to the pre-amplifier input.

(a6) Sensor assembly

The sensor assembly is a three-stage amplifier including :
- a 25Hz filter network in the first stage; the filters reject all audio frequencies except 25Hz signal which is amplified in the second and third stages.

- the last stage drives a sensor relay.

(a7) Cueing lamp assemblies

The cueing lamps are mounted on the main frame of the tape reproducer. They provide the illumination through the magazine aperture and tape window for the cueing photocells.

(b) Electrical characteristics

Power Requirements	115VAC-400Hz-40W 28VDC-21W
Frequency Response	± 3db, 100 to 7500Hz
Flutter	Less than 0.2% of modulated signal
Signal-to-Noise Ratio	35db minimum
Control Response Time	500 milliseconds
Tape Speed	1.7/8 inch/sec (4.8 cm/s)
Magazine Capacity	5
Audio Output	One symmetrical (CT) or one asymmetrical

(2) Tape magazine

(a) Physical characteristics

Each tape magazine includes a tape but also a playback system (drive, playback heads, cueing photocells).

(a1) Magnetic Tape

The magnetic tape is an endless loop of 1/4 inch (6.35 mm) which has four recorded tracks each track with a maximum of 15 minutes running time, providing a total playing time of one hour approximately.

(a2) Drive system

The drive system includes a starting capstan, a pinch roller rocker, guide rollers, tension pads, all serving to provide optimum contact between magnetic tape and playback heads.

(a3) Playback heads

Two 2-track playback heads are mounted in each tape magazine. The playback head develops an audio signal proportional to the amplitude and frequency of the magnetic field recorded on the tape. Tracks 1 and 3 are reproduced by one head; tracks 2 and 4 are reproduced by the other head. The two heads are installed in a stepped surface so that the two pairs of tracks interlace.

(a4) Cueing photocells

A cadmium selenite photocell is installed opposite a light aperture in each magazine. The cueing lamp mounted in the tape reproducer assembly emits light through the aperture and energizes the photocell when the tape "window" appears. The "window" is a section of the tape where the magnetic oxyde has been removed, leaving only the clear polyester base.
The resistance of the photocell is :
- over 500 kilo-ohms when not energized
- under 600 ohms when energized

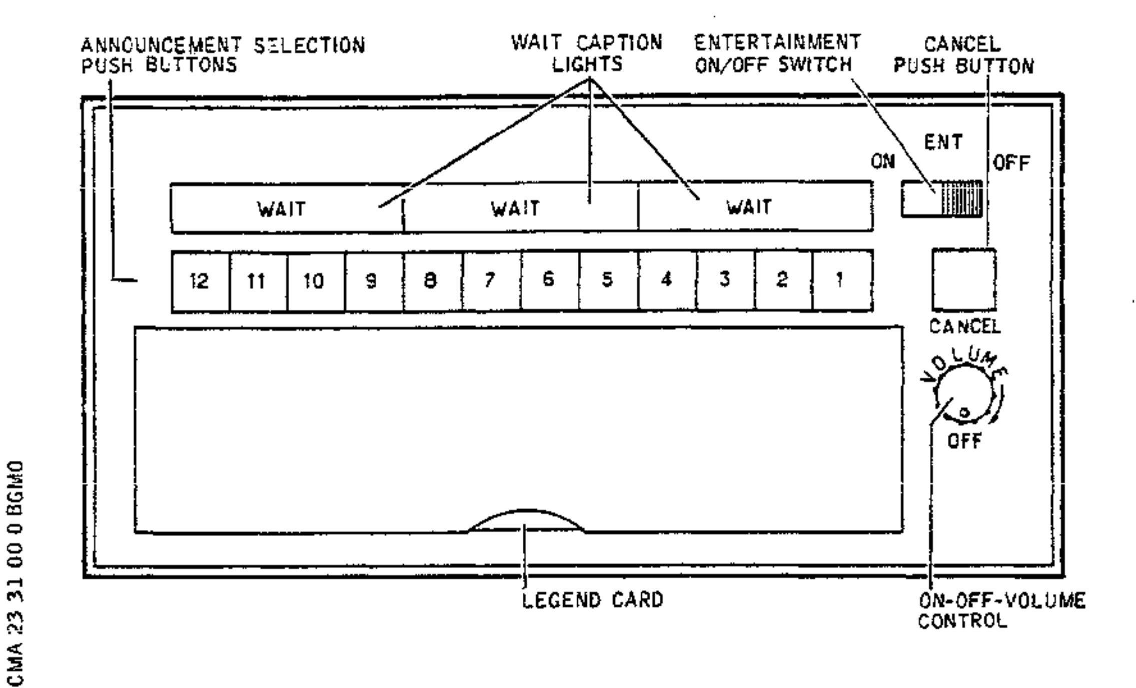
(b) Electrical characteristics

Playing Time	6 seconds to 15 minutes per track
Tape Capacity	140 feet (42.700 m)
Tape Type	1/4 inch (6.35 mm)
Tracks	4
Playback heads	2 for 4 tracks

(3) Steward's Control Unit (Ref. Fig. 004)

The Steward's control unit controls the desired announcements to be played.
Selection of the announcement is made by pressing the appropriate numbered push-button. If the background music is playing, it will be interrupted for the duration of the message.
The Steward may correct an error in announcement selection by pressing CANCEL push-button.
The control unit contains all the operational controls for the tape reproducer system.

(a) VOLUME-OFF control



Steward's Control Unit - Front Panel
Figure 004

The VOLUME-OFF control knob incorporates a potentiometer.
When control knob leaves the OFF position, the system is supplied with power. Rotating the volume control knob clockwise results in metering of the desired music level.

(b) CANCEL push-button

If a wrong announcement has been selected, or if any difficulty is noticed with the announcement, the audio may be cut off by pressing CANCEL push-button. When cancelled, the announcement cannot be replayed until the magazine has recued, this being indicated by the WAIT caption light which extinguishes.
Music will be played after CANCEL push-button has been pressed.

(c) WAIT caption lights

The WAIT caption light illuminates if the selec-

ted announcement magazine is not ready for immediate playback.
This may be :
- because the tape has not completely finished a previous announcement in the same magazine
- because there is no tape magazine in the reproducer for the selected track.

When one tape is cueing, another announcement or music program can be selected in other magazine.
When WAIT caption lights are off, pressing one of the twelve selection push-buttons initiates the reproduction of the selected announcement and energizes the public address amplifier keyline.
When an announcement is selected, the music will be interrupted for the duration of the message.
The background music will be reproduced at the completion of the announcement.

(d) Selection push-buttons

The 12 push-buttons enable the selection of any of the 12 announcements.
- Announcements 1, 2, 3 and 4 are located in tape magazine 3
- Announcements 5, 6, 7 and 8 are located in tape magazine 4
- Announcements 9, 10, 11 and 12 are located in tape magazine 5

(e) ENT ON/OFF Switch
If used, provides a means of turning music on and off.

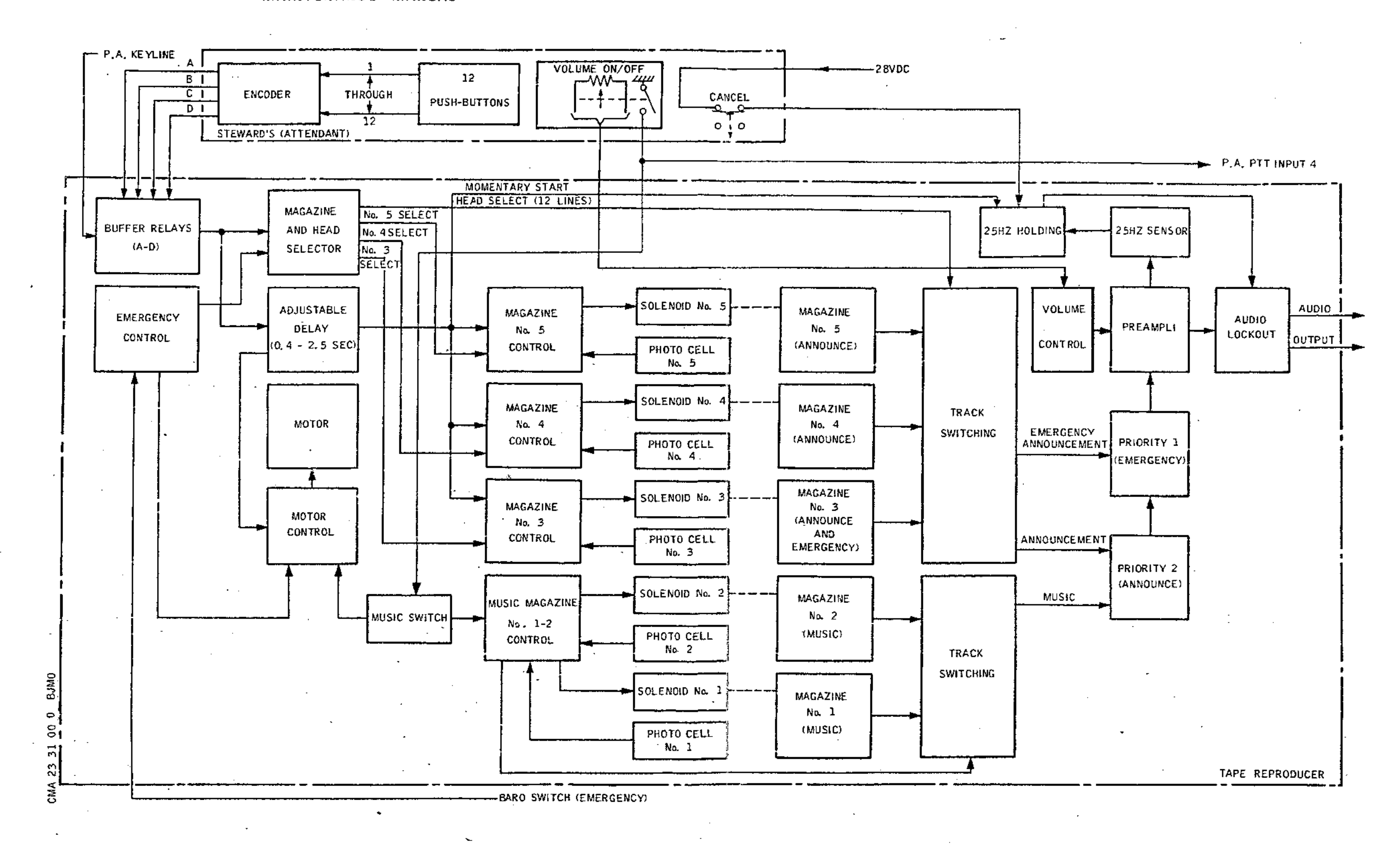
(f) Legend card

A printed circuit allows to display titles corresponding to the information to be reproduced.

C. Operation (Ref. Fig. 005)

(1) Tape Reproducer and Steward's Control Unit

When one of the twelve announcements is selected by pressing the appropriate push-button, the announcement is coded and directed to the tape reproducer where it is received by buffer relays which apply the signal to :
- the magazine and head selector which determines which magazine solenoid and channel to operate
- the delay circuit the output of which :
  - energizes the selected solenoid
  - applies a signal to the motor control circuit to



Tape Reproducer - Block Diagram
Figure 005

energize drive and blower motors.
Activation of the drive motor causes the tape to start moving. As soon as the tape moves, a 25Hz signal recorded at an inaudible level with the selected announcement is sensed by a sensor circuit which activates the announce relay.
The announce relay :
- de-energizes music output relay
- disables the announce channel selector
- energizes the public address amplifier keyline
- turns on the announce audio lumistor (composed of a photocell, a lamp and a resistor).

Output from the selected head is applied to priority 2 stage which directs the signal to the pre-amplifier circuit via priority 1 stage provided no emergency announcement is present.
The 25Hz "holding"circuit :
- is activated by the 25Hz sensor output
- is de-activated by either the loss of 25Hz input or by pressing CANCEL push-button

The audio lockout circuit is de-activated when the output from the emergency or normal announcement is applied. On completion of the announcement, the sensor circuit de-activates the announce relay.

(2) Tape Magazine

When the selected solenoid is energized, the armature pin extends into the magazine to actuate the rocker arm assembly carrying the pinch roller. The roller presses the tape against the rotating capstan to move the tape past the playback heads resulting in the reproduction of the selected channel.
When the "window" on the tape appears between the photocell and the cueing lamp, the photocell resistor decreases, indicating the end of that track.

(3) Emergency Announcement

The emergency announcement is selected manually or automatically.

(a) Manual selection

Manual activation is obtained by pressing push-button No.1 on Steward's control unit.
The tape reproducer will operate as for normal announcements, except that emergency announcement priority 1 stage will cancel either music or
B any other announcement in progress. Guards have
B been placed over press buttons 1 & 2 to prevent

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B inadvertent operation.

(b) Automatic selection

With emergency relay energized, the following events occur automatically :
- Magazine 3 solenoid is energized
- Channel 1 audio signal is coupled directly to the pre-amplifier input
- Music and normal announcement inputs to the pre-amplifier are closed.
- the gain of the pre-amplifier is increased by 10db.

At the end of the emergency announcement, the announce relay is de-energized, thus opening channel 1 input to the pre-amplifier. The motor and magazine will continue running with no system audio output until the emergency announcement start line is released.

5. Operation
(Ref. Fig. 006)

A. Power Supply

The public address system is supplied by EMERGENCY A 28VDC current through circuit breaker R139.

B. Amplification

The public address amplifier provides a priority sequence as regards the channel selected.
Utilization of one channel results in automatic cut-off of the other channels having a lower priority rank in the priority sequence.

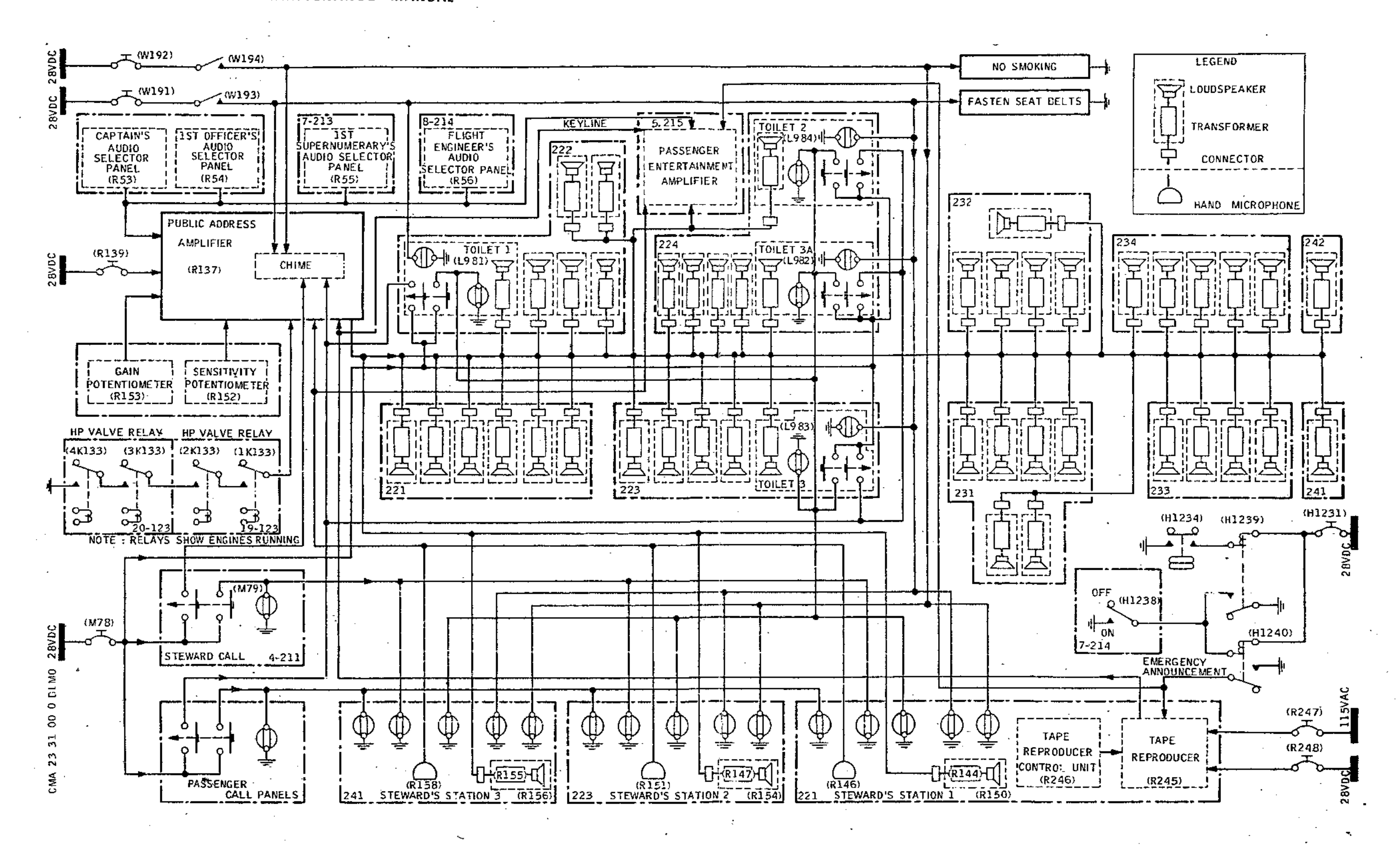
(1) Priority Sequence

(a) Priority 1 (channel 1)

Only for crew members' use, channel 1 takes absolute priority over other channels. Crew members may transmit announcements to the loudspeakers in Stewards' stations and cabin by engaging PA key on audio selector panel.

(b) Priority 2 (channel 2)

Only for Stewards' use, channel 2 takes priority over the tape reproducer circuit. The Stewards may



Public Address - Block Diagram
Figure 006

transmit announcement to cabin loudspeakers by means of microphones located at each Steward's panel.

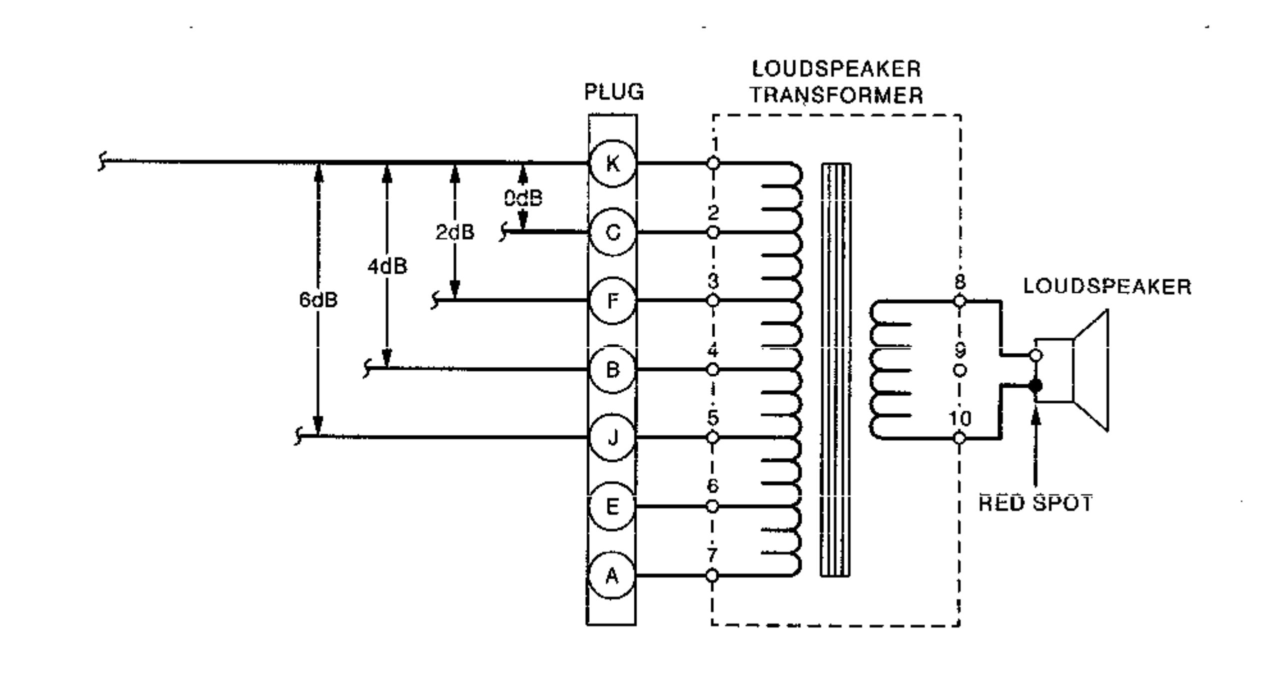
(c) Priority 3 (Channel 3)

Only for reproducer circuit, channel 3 allows reproduction of pre-recorded announcements and music.

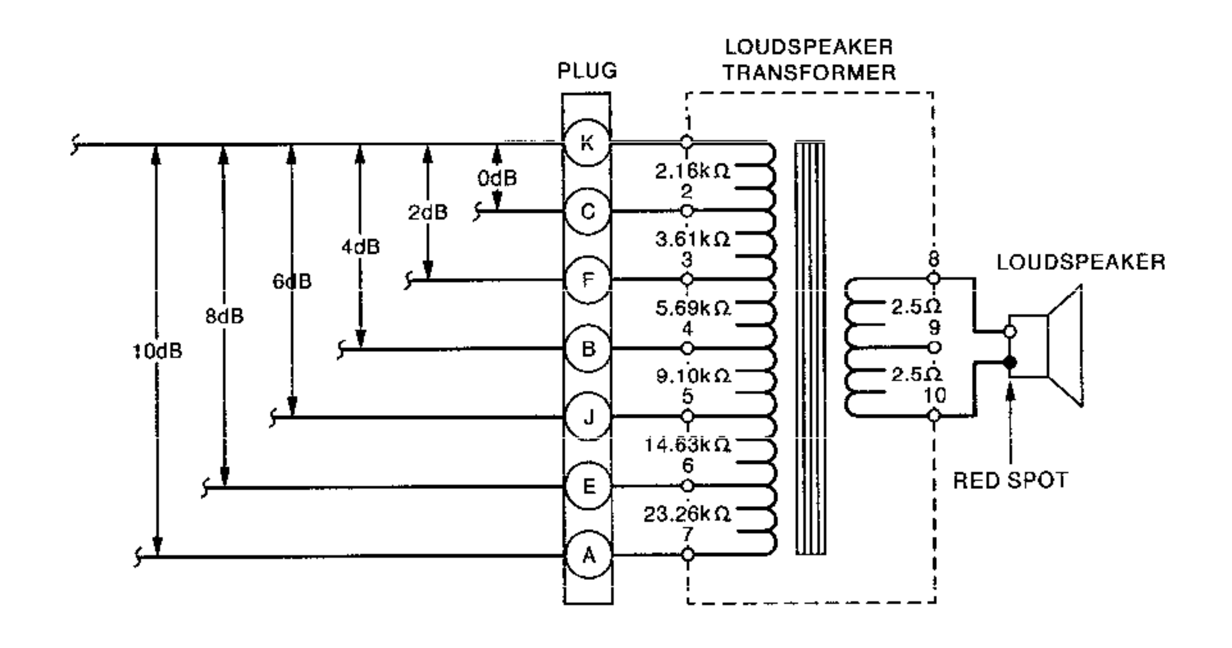
(2) Sensitivity and Attenuation Controls

Metering of sensitivity and gain is ensured respectively by two potentiometers R152 and R153. As soon as one engine starts running, the attenuation circuit is inhibited by means of contacts 1K133 to 4K133 located in the engines.

C. Loudspeaker Attenuation (Ref. Fig. 007A and 007B)



RB Loudspeaker Wiring Connection for
RB Attenuation of Cabin Speakers
RB Figure 007A



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RB Loudspeaker Wiring Connections for Attenuation
RB of Toilet and Steward's Speakers
RB Figure 007B

An attenuation circuit is also provided on loudspeaker circuits as regards their respective locations in the cabin.

ZONE	NUMBER OF LOUDSPEAKERS	PLUG WIRING CONNECTION	RESULTING ATTENUATION
221 222 223 224	6 5 4 4	Between Pins K and B	-4 dB
231	6	Between Pins K and F	-2 dB
232	4	Between Pins K and F	-2 dB
233 234 241 242	4 5 1 1	Between Pins K and C	0 dB
222 (Toilet1) 223 (Toilet2) 224 (Toilet3)	1 1 1	Between Pins K and J	-6 dB

D. Electronic Chime

The electronic chime is a two-tone chime having a high (HI) and a low (LO) tone.
HI and LO tones may be used separately or be combined in a HI-LO tone on four different channels:

B - Channel 1, 'passengers', HI tone (DELETED CM 42018)
- Channel 2, 'stewards', HI-LO tone
- Channel 3, 'belts', LO tone
- Channel 4, 'smoke', LO tone.

The electronic chime allows peoples attention to be drawn before broadcasting a call or message.

E. Calls and Instructions

(1) Passenger call

When the passengers press integrally lighted call push-

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buttons accessible from their seats or in the toilets, a +28VDC signal is applied to :

B

- Either FORWARD, CENTRAL or AFT indicator light on Stewards' panels, thus enabling to situate the call.

NOTE : Passenger call is cancelled by pressing again the relevant push-button. The call from the toilets is cancelled by pressing the indicator light on the outer panel of the toilet.

(2) Steward Call

When the crew members press STEWARD CALL indicator light/switch on panel 4-211 in the flight compartment, a +28VDC signal is applied to :
- Steward (attendant) channel 2 which actuates chime HI-LO tone
- FLIGHT CALL indicator lights/switches on Stewards' panels illuminate.

NOTE : The call from the flight compartment is cancelled out by pressing FD CALL CANCEL push-button at one of the Stewards' stations.
When pressing FLIGHT DECK indicator light/switch at one of the Stewards' stations, the Steward call indicator light/switch

(3) "fasten seat belts" Instruction

When FASTEN SEAT BELTS switch (W193) on panel 4-211 is placed in ON position, a +28VDC signal is applied to :
- FASTEN SEAT BELTS channel 3 which actuates chime LO tone.
- The signs located in the passenger compartment and the indicator lights on Stewards' panels which illuminate
- The RETURN TO CABIN sign in the toilets which illuminate.

(4) "No smoking" Instruction

When NO SMKG switch (W194) on panel 4-211 is placed in ON position, a +28VDC is applied to
- NO SMOKING channel 4 which actuates chime LO tone
- the signs located in the passenger compartment and the indicator lights on Stewards' panels which illuminate.

F. Tape Reproducer

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The tape reproducer enables reproduction of announcements and music from a special selection. The tape reproducer includes :
- A number of channels enabling broadcasting of pre-recorded announcements, one channel being specially designed for emergency announcements.
- A background music channel

Depending on tape reproducer utilization, a priority sequence establishes priorities as follows :
- Priority 1 : emergency announcement
- Priority 2 : general announcements
- Priority 3 : background music

(1) Priority 1

(a) Automatic Actuation

In the event of cabin decompression for an altitude above the determined threshold, the high pressure switch emergency supply aneroid (H1234) activates emergency oxygen services slave relay (H1239) which energizes emergency oxygen services relay (H1240) a function of which switches on tape reproducer emergency announcement priority 1.

(b) Manual Actuation

In manual mode, emergency oxygen services relay (H1240) is controlled by emergency oxygen manual override switch (H1238) which can be actuated by the Flight Engineer (panel 7-214).

(2) Priority 2

Priority 2 corresponds to broadcasting of announcements selected from public address control unit.

(3) Priority 3

Priority 3 corresponds to broadcasting of background music. Music may be played during all flight as well as during passenger boarding and deplaning. The music program will be interrupted for the duration of any announcement.

PUBLIC ADDRESS - TROUBLE SHOOTING

WARNING : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the public address system to be quickly rectified.
The defects can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.
Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information, including component location, required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
4 Boomsets	Aircraft Equipment
3 Hand Microphones	Aircraft Equipment
Circuit Breaker Safety Clips	

B. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

C. Operate electronics rack ventilation (Ref. 21-21-00).

D. Remove access panels 216AS, 216BS and 216ES.

E. On Captain's and First Officer's control column handwheels, place RAD-INT PTT switches in intermediate position.

F. On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(1) All keys on keyboard are disengaged.

(2) All reception push-buttons are engaged.

(3) The INT-RADIO PTT switch is in intermediate position.

(4) The VOICE ONLY push-button is disengaged.

G. On Captain's, First Officer's, Flight Engineer's and First Supernumerary's jack panels :

(1) Connect a boomset to BOOM jack.

(2) Place MIC SELECT OXY-BOOM switch in BOOM position.

H. At all Stewards' stations, make certain that the hand microphones are in place.

I. On overhead panel 4-211, make certain that :

(1) FASTEN SEAT BELTS switch is in OFF position.

(2) NO SMKG switch is in OFF position.

(3) STEWARD CALL indicator light/switch is disengaged.

J. At Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

K. At Forward Steward's station (in zone 221), make certain that :

(1) On panel 1-221, TAPE REPRODUCER and PASS STEREO switches are in OFF position.

(2) Announcement and music magazines are in place in the tape reproducer.

L. make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 2 HP VALVE CONT	1-213	2K 131	C 3
ENG 3 HP VALVE CONT		3K 131	C 4
EMERG PASS OXY IND		H1231	C11
NO.1 INPH SUP		R 89	K19
PA SUP		R 139	K20
FASTEN S/BLTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
TAPE REPRO DC. SUP		R 248	L19
3CM AUDIO SELECTOR SUP		R 243	L20
1ST PILT AUDIO SELECTOR SUP		R 241	L21
TAPE REPRO AC SUP	2-213	R 247	G21
ENG 1 HP VALVE CONT	3-213	1K 131	C 1
ENG 4 HP VALVE CONT		4K 131	C 2
NO.2 INPH SUP		R 90	H 2
2ND PILT AUDIO SELECTOR SUP		R 242	H 3
1ST SUPERNY AUDIO SELECTOR SUP		R 244	H 4
PASS CALL SUP	15-216	M 78	A22

M. Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMERG PASS OXY CONT	1-213	H1232	C10
NO.1 T1 PROBE HTR SUP	13-215	1H 542	C 9
NO.2 T1 PROBE HTR SUP	14-215	2H 542	E 8
NO.4 T1 PROBE HTR SUP	13-216	4H 542	C11
NO.3 T1 PROBE HTR SUP	14-216	3H 542	C14

3. Trouble Shooting

```
*****************************************************
* Check public address (PA) amplifier self-test     *
* function.                                         *
*                                                   *
* 1. On self 5-216 of RH electronics rack, place    *
*    and hold CALIBR-NORMAL-TEST selector switch lo- *
*    cated on front panel of amplifier [1] in CALIBR *
*    position                                       *
*    - The pointer of amplifier VU-meter deflects   *
*      and reads 0 db.                              *
*                                                   *
* 2. Place and hold CALIBR-NORMAL-TEST selector     *
*    switch in TEST position.                       *
*    - A 587 Hz audio signal is heard at all passen- *
*      ger compartment, toilets and stewards' sta-  *
*      tions loudspeakers.                          *
*                                                   *
* 3. Release and place selector switch in normal    *
*    position.                             IF       *
*****************************************************
```

IF		Result
OK	NOT OK	VU-meter pointer neither deflects nor reads 0 db. Ref. Chart 101.
OK	NOT OK	VU-meter pointer deflects but does not read 0 db. Replace PA amplifier [1]
OK	NOT OK	No audio signal at passenger compartment, toilets and stewards' stations loudspeakers. Replace PA amplifier [1]
OK	NOT OK	No audio signal at Stewards' stations loudspeakers only. Ref. Chart 102.
OK	NOT OK	No audio signal at passenger compartment and toilets loudspeakers only. Ref. Chart 103.
OK	NOT OK	No audio signal at one passenger compartment or toilet loudspeaker only. Ref. Chart 104.

```
*******************************************************
* Announcements made by the crew members              *
*                                                     *
* 1. On audio selector panels [3], [4], [5] and [6]:  *
*    - engage PA key                                  *
*    - disengage PA reception push-button and place   *
*      integral potentiometer in intermediate posi-   *
*      tion.                                          *
*                                                     *
* 2. Place and hold INT-RADIO-PTT switch on Captain   *
*    audio selector panel in RADIO position and       *
*    speak in boomset microphone.                     *
*    - check reception at passenger compartment,      *
*      toilets and Stewards' stations loudspeakers    *
*    - check reception at boomsets on First Offi-     *
*      cer's, Flight Engineer's and First Supernu-    *
*      merary's jack panels.                    IF    *
*******************************************************
     ||     |
     ||     |        ---------------------------------------------------
     ||     |       | No reception at passenger compartment, toilets   |
     OK     NOT OK--| and Stewards' stations loudspeakers.             |
     ||     |       | Ref. Chart 105.                                  |
     ||     |        ---------------------------------------------------
     ||     |
     ||     |        ---------------------------------------------------
     ||     |       | Reception at passenger compartment, toilets and  |
     ||     |       | Stewards' stations loudspeakers.                 |
     OK     NOT OK--| No reception at one/all three First Officer's,   |
     ||     |       | Flight Engineer's and First Supernumerary's      |
     ||     |       | boomsets. Ref. 23-41-00, Trouble Shooting        |
     ||     |        ---------------------------------------------------
     ||     |
*******************************************************
* Announcements made by the Stewards                  *
*                                                     *
* At one Steward's station, speak in hand microphone  *
* while holding PTT switch pressed.                   *
* - check reception in passenger compartment and      *
*   toilets loudspeakers.                       IF    *
*******************************************************
     ||     |
     ||     |        ---------------------------------------------------
     ||     |       | No reception at passenger compartment and toi-   |
     OK     NOT OK--| lets loudspeakers. Ref. Chart 106.               |
     ||              ---------------------------------------------------
     ||
```

```
***************************************************
* Priority of crew member's messages              *
*                                                 *
* 1. At one Steward's station, speak in hand      *
*    microphone while holding PTT switch pressed.*
*    - check reception at passenger compartment  *
*      and toilets loudspeakers.                  *
*                                                 *
* 2. From a crew member's audio selector panel,  *
*    speak in boomset microphone while holding    *
*    INT-RADIO PTT switch on audio selector       *
*    panel in RADIO position.                     *
*    - check that crew member's message replaces *
*      Steward's message.                       IF*
***************************************************
     ||     |
     OK     NOT OK --| Replace PA amplifier [1] |
     ||     |

***************************************************
* Check attenuation using HP VALVES switches      *
* 1, 2, 3 and 4                                   *
*                                                 *
* 1. On fuel panel 5-214, make certain that the  *
*    four LP VALVE switches are in SHUT 1         *
*    position.                                    *
*                                                 *
* 2. On panel 4-211, make certain that HP VALVE  *
*    switches 1, 2, 3 and 4 are in SHUT position *
*    and the four engine shut down handles are    *
*    pushed (normal position).                    *
*                                                 *
* 3. From one Steward's station, speak in hand   *
*    microphone while holding PTT switch pressed:*
*    - appreciate the audio level at passenger    *
*      compartment and toilets loudspeakers.      *
*                                                 *
* 4. On panel 4-211, place HP VALVE switch 1     *
*    (2,3,4) in OPEN position:                    *
*    - the audio level increases at passenger     *
*      compartment and toilets loudspeakers.    IF*
***************************************************
     ||     |
     OK     NOT OK --| Audio level does not increase. Ref. Chart 107. |
     ||     |
```

OK | NOT OK — PA amplifier output at minimum level, dependant on whether engines OFF or ON. At Mach 1 system is satisfactory. Ref. Chart 107A.

OK | NOT OK — PA amplifier at maximum at all times. Ref. Chart 107B.

OK | NOT OK — PA amplifier at high level at all times. 6dBs down when engines are off. Ref. Chart 107C.

```
*****************************************************
* On panel 1-213 trip circuit breaker W513.         *
* Switch on air data computer and carry out an ADC  *
* Self Test 2 (34-11-41, Adjustment/Test):          *
* - the audio level increases at passenger          *
*   compartment and toilets loudspeakers.         IF*
*****************************************************
```

OK | NOT OK — PA amplifier output does not increase automatically above Mach 1. Ref. Chart 107D.

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*******************************************************
* Captain-to-Steward Call                             *
*                                                     *
* 1. On panel 4-211, press Steward call indicator     *
*    light/switch [12].                               *
*    - at Stewards' stations, FLIGHT DECK CALL        *
*      indicator light/switch illuminates             *
*    - the call overhead indicator lights illuminate *
*      above passenger compartment aisle              *
*    - the chime HI-LO tone only is heard at          *
*      Stewards' stations loudspeakers.               *
*                                                     *
* 2. At one Steward's station, press FLIGHT DECK CALL*
*    indicator light/switch                           *
*    - FLIGHT DECK CALL indicator lights/switches at *
*      the three Stewards' stations and the call      *
*      overhead indicator lights extinguish.   IF    *
*******************************************************
    ||     |
    ||     |      ------------------------------------------------
    ||     |     | Either HI or LO tone is heard at Stewards'     |
    ||     |     | stations loudspeakers                          |
    OK     NOT OK--| Replace PA amplifier [1].                    |
    ||     |      ------------------------------------------------
    ||     |
    ||     |      ------------------------------------------------
    ||     |     | Neither HI nor LO tone is heard at Stewards'   |
    ||     |     | stations loudspeakers                          |
    OK     NOT OK--| Ref. Chart 108.                              |
    ||     |      ------------------------------------------------
    ||     |
    ||     |      ------------------------------------------------
    ||     |     | FLIGHT DECK CALL indicator lights/switches at  |
    ||     |     | Stewards' stations or the call overhead indica-|
    OK     NOT OK--| tor lights do not operate.                   |
    ||     |     | Ref. 33-27-00, Trouble Shooting                |
    ||     |      ------------------------------------------------
    ||     |
    ||     |      ------------------------------------------------
    ||     |     | The HI/LO tone is heard at passenger compart-  |
    ||     |     | ment and toilets loudspeakers. On connector    |
    OK     NOT OK--| R137-A on amplifier rack, make certain that  |
    ||           | pins 17 and 18 are not shunted and that pins 19|
    ||           | and 22 are grounded (Ref. WDM 23-31-11)        |
    ||            ------------------------------------------------
```

```
*****************************************************
* Passenger-to-Steward Call                         *
*                                                   *
* 1. On one of the passenger amenity panels in the  *
*    passenger compartment, press call indicator    *
*    light/switch identified with Steward engraving. *
*    - this indicator light/switch illuminates      *
*    - at the three Stewards' stations, CABIN CALL  *
*      lights illuminate                            *
*    - the passenger call overhead indicator lights *
*      illuminate.                                  *
*    - the chime HI tone only is heard at Stewards' *
*      stations loudspeakers.                       *
*                                                   *
* 2. Press again the call indicator light/switch    *
*    - this indicator light/switch extinguishes     *
*    - the CABIN CALL lights and the passenger over *
*      head indicator lights extinguish.      IF    *
*****************************************************
     ||     |
     ||     |     ------------------------------------------------
     ||     |    | The chime HI tone is not heard at Stewards'    |
     ||     |    | stations loudspeakers                          |
     OK     NOT OK--| Ref. Chart 109.                           |
     ||     |     ------------------------------------------------
     ||     |
     ||     |     ------------------------------------------------
     ||     |    | CABIN CALL lights at Stewards' stations and the|
     ||     |    | passenger call overhead indicator lights do not|
     OK     NOT OK--| operate.                                  |
     ||     |    | Ref. 33-27-00, Trouble Shooting                |
     ||     |     ------------------------------------------------
     ||     |
     ||     |     ------------------------------------------------
     ||     |    | The chime HI tone is heard at passenger com-   |
     ||     |    | partment and toilets loudspeakers. On connector|
     ||     |    | R137-A on amplifier rack, make certain that    |
     OK     NOT OK--| pins 17 and 18 are not shunted and that pins 19|
     ||          | and 22 are grounded. (Ref. WDM 23-31-11).     |
     ||           ------------------------------------------------
     ||
```

```
****************************************************
* FASTEN SEAT BELTS signs                          *
*                                                  *
* 1. On panel 4-211, place FASTEN SEAT BELTS switch *
*    [13] in ON position :                         *
*    - FASTEN SEAT BELTS signs in passenger compart- *
*      ment and at Stewards' stations illuminate   *
*    - RETURN TO CABIN signs illuminate in toilets *
*    - The chime LO tone is heard at passenger comp- *
*      artment, toilets and Stewards' stations loud- *
*      speakers.                                   *
*                                                  *
* 2. Place switch [13] in OFF position.            *
*    - The chime LO tone is heard again at the loud- *
*      speakers.                                   *
*    - FASTEN SEAT BELTS signs extinguish.         *
*    - RETURN TO CABIN signs extinguish.       IF  *
****************************************************
    ||     |
    ||     |      -----------------------------------------------
    ||     |     | LO tone is heard only for ON or OFF position of |
    OK     NOT OK--| switch [13].                                  |
    ||     |     | Replace PA amplifier [1].                     |
    ||     |      -----------------------------------------------
    ||     |
    ||     |      -----------------------------------------------
    OK     NOT OK--| LO tone is not heard at the loudspeakers.     |
    ||     |     | Ref. Chart 110.                               |
    ||     |      -----------------------------------------------
    ||     |
    ||     |      -----------------------------------------------
    ||     |     | LO tone is heard at the loudspeakers but FASTEN |
    ||     |     | SEAT BELTS or RETURN TO CABIN signs do not    |
    OK     NOT OK--| illuminate.                                   |
    ||           | Ref. 33-25-00, Trouble Shooting               |
    ||            -----------------------------------------------
    ||
```

```
****************************************************
* NO SMOKING signs                                 *
*                                                  *
* 1. On panel 4-211, place NO SMKG switch [14] in ON *
*    position:                                     *
*    - NO SMOKING signs in passenger compartment and *
*      at Stewards' stations illuminate.           *
*    - the chime LO tone is heard at passenger comp- *
*      artment, toilets and Stewards' stations loud- *
*      speakers.                                   *
*                                                  *
* 2. Place switch [14] in OFF position.            *
*    - the chime LO tone is heard again at loud-   *
*      speakers.                                   *
*    - NO SMOKING signs extinguish.          IF    *
****************************************************
     ||     |
     ||     |    ------------------------------------------------
     ||     |   | LO tone is heard only for ON or OFF position  |
     OK     NOT OK--| of switch [14].                           |
     ||     |   | Replace PA amplifier [1].                     |
     ||     |    ------------------------------------------------
     ||     |
     ||     |    ------------------------------------------------
     ||     |   | LO tone is not heard at the loudspeakers.     |
     OK     NOT OK--| Ref. Chart 111.                           |
     ||     |    ------------------------------------------------
     ||     |
     ||     |    ------------------------------------------------
     ||     |   | LO tone is heard at the loudspeakers but NO   |
     ||     |   | SMOKING signs do not illuminate               |
     OK     NOT OK--| Ref. 33-25-00, Trouble Shooting           |
     ||          ------------------------------------------------
     ||
     ||
```

```
*****************************************************
* Adjustment of PA amplifier output level           *
*                                                   *
* 1. At forward Stewards' station, speak in hand    *
*    microphone while holding PTT switch pressed.   *
*                                                   *
* 2. When speaking in microphone, turn VOLUME poten- *
*    tiometer [15] and SENSITIVITY potentiometer [16]*
*    located in RH electronics rack (shelf 11-216)  *
*    clockwise and counterclockwise.                *
*    - the audio level at loudspeakers should in-   *
*      crease and decrease successively.       IF   *
*****************************************************
    ||     |
    ||     |    ---------------------------------------------------
    ||     |   | Audio level unchanged when acting on potentio-   |
    OK    NOT OK--| meter [15] or [16]. Ref. Chart 112.           |
    ||     |    ---------------------------------------------------
    ||     |
*****************************************************
* Broadcasting of pre-recorded announcements        *
* (NOTE: Procedure described for magazine A, track 2,*
* repeat same procedure for all tracks of magazines  *
* A, B and C)                                       *
*                                                   *
* 1. On tape reproducer control unit [17] at forward *
*    Steward's station, press push-buttons to select *
*    magazine A, track 2 and then ANN push-button.  *
*    - magazine and track selection push-buttons    *
*      illuminate.                                  *
*    - magazine A status light illuminates          *
*    - the announcement is broadcast at passenger   *
*      compartment and toilets loudspeakers.        *
*                                                   *
* 2. On tape reproducer control unit [17], press    *
*    CANCEL push-button :                           *
*    - the announcement stops.                 IF   *
*****************************************************
    ||     |
    ||     |    ---------------------------------------------------
    OK    NOT OK--| No announcement broadcast. Ref. Chart 113.    |
    ||     |    ---------------------------------------------------
    ||     |
    ||     |    ---------------------------------------------------
    OK    NOT OK--| Only a few announcements are not broadcast.   |
    ||          | CANCEL function inoperative. Ref. Chart 114.  |
    ||          ---------------------------------------------------
```

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```
****************************************************
* Broadcasting of emergency announcement           *
*                                                  *
* 1. On panel 1-213, make certain that EMERG PASS  *
*    OXY CONT circuit breaker H1232 (C10) is trip- *
*    ped, safetied and tagged.                     *
*                                                  *
* 2. On tape reproducer control unit [17], press   *
*    push-buttons to select magazine B, track 2 and *
*    then ANN push-button :                        *
*    - selection push-buttons and status light asso- *
*      ciated with selected magazine illuminate    *
*    - the selected announcement is broadcast at   *
*      loudspeakers.                               *
*                                                  *
* 3. While selected announcement is broadcast, place *
*    PASSENGER SYSTEM EMERG MANUAL O/RIDE switch   *
*    [21] located on panel 7-214, in ON position : *
*    - at the loudspeakers, the announcement in pro- *
*      gress is replaced by the emergency announce- *
*      ment (which has a top priority).      IF    *
****************************************************
    ||    |
    ||    |    ------------------------------------------------
    ||    |   | The emergency announcement is not broadcast   |
    OK    NOT OK--| Ref. Chart 115.                           |
    ||    |    ------------------------------------------------
    ||    |
    ||    |    ------------------------------------------------
    ||    |   | The emergency announcement is broadcast but it |
    OK    NOT OK--| does not replace the announcement in progress |
    ||        | Replace tape recorder [20].                   |
    ||         ------------------------------------------------
    ||
```

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```
****************************************************
* Broadcasting of music to passengers              *
*                                                  *
* 1. On tape reproducer control unit [17], press   *
*    CANCEL push-button.                           *
*                                                  *
* 2. At forward Steward's station, on front panel of *
*    tape reproducer [20], place BGM selector switch *
*    in position 1 (track 1).                      *
*    On panel 1-221, place VOLUME potentiometer [24] *
*    in intermediate position and TAPE REPRODUCER  *
*    switch [25] in ON position.                   *
*    - music from track 1 is broadcast at passenger *
*      compartment and toilets loudspeakers.       *
*                                                  *
* 3. Place BGM selector switch successively in posi- *
*    tion 2, 3 and 4.                              *
*    - check for each position of selector switch  *
*      that music is broadcast and changes with the *
*      track selected.                             *
*                                                  *
* 4. Turn VOLUME potentiometer [24] clockwise then *
*    counterclockwise :                            *
*    - the audio level of music at loudspeakers    *
*      increases and then decreases.               *
*                                                  *
* 5. Place BGM selector switch in position A :     *
*    - music is broadcast at loudspeakers          *
*      (automatic selection of the four tracks). IF *
****************************************************
    ||     |
    ||     |      ---------------------------------------------------
    ||     |     | No music broadcast for any position of BGM        |
    OK     NOT OK--| selector switch. Ref. Chart 116.                  |
    ||     |      ---------------------------------------------------
    ||     |
    ||     |      ---------------------------------------------------
    ||     |     | No music broadcast for certain positions of BGM   |
    OK     NOT OK--| selector switch. Replace tape reproducer [20].    |
    ||     |      ---------------------------------------------------
    ||     |
    ||     |      ---------------------------------------------------
    ||     |     | Music audio level unchanged when acting on        |
    OK     NOT OK--| VOLUME potentiometer [24]. Ref. Chart 117.        |
    ||            ---------------------------------------------------
    ||
    ||
```

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```
****************************************************
* Priority of Stewards' messages over pre-recorded   *
* announcements.                                     *
*                                                    *
* 1. On tape reproducer control unit [17], select    *
*    one announcement in magazine A, B or C and      *
*    press ANN push-button :                         *
*    - the selected announcement is broadcast at the *
*      loudspeakers.                                 *
*                                                    *
* 2. While selected announcement is broadcast, speak *
*    in microphone at Steward's station, pressing    *
*    PTT switch :                                    *
*    - the announcement stops and is replaced by     *
*      Steward's message at loudspeakers.       IF   *
****************************************************
    ||     |
    ||     |   ----------------------------------------------------
    OK    NOT OK--| Steward's message does not replace pre-recorded|
    ||     |      | announcement. Replace PA amplifier [1].        |
    ||     |   ----------------------------------------------------
    ||     |
****************************************************
* Priority of announcements over music               *
*                                                    *
* 1. At forward Steward's station, on front panel of *
*    tape reproducer [20] place BGM selector switch  *
*    in position 1, 2, 3 or 4.                       *
*                                                    *
* 2. On panel 1-221, place TAPE REPRODUCER switch    *
*    [25] in ON position :                           *
*    - music is broadcast at loudspeakers            *
*                                                    *
* 3. While music is broadcast, on tape reproducer    *
*    control unit [17] select one announcement in    *
*    magazine A, B or C and press ANN push-button :  *
*    - music program in progress stops and is re-    *
*      placed by the selected announcement.     IF   *
****************************************************
    ||     |
    ||     |   ----------------------------------------------------
    OK    NOT OK==| The announcement does not replace music.     |
    ||            | Replace tape recorder [20].                   |
    ||         ----------------------------------------------------
    ||
****************************************************
* Public address system is serviceable.              *
****************************************************
```

```
**************************************
* VU-METER POINTER NEITHER DEFLECTS  *
* NOR READS "0"                      *
**************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

```
*******************************************************
* Check 28 VDC supply at circuit breaker [2].         *
*******************************************************
              |               |
              |               |
        NOT OK               OK-----  Replace PA amplifier [1].
              |
              |
  Replace circuit breaker [2].
```

Chart 101

```
*************************************
* NO AUDIO SIGNAL AT STEWARDS' STA-  *
* TIONS LOUDSPEAKERS ONLY.           *
*************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

```
*****************************************************
* Trip circuit breaker[2].                          *
* Remove PA amplifier [1]. Check continuity of elec- *
* trical line of the three series-connected Steward  *
* stations loudspeakers, between pin 13 and pin 14   *
* of rack connector R137-A (Ref. WDM 23-31-18).      *
*****************************************************
         |                  |
       NOT OK               OK----- Replace PA amplifier [1].
         |
   Check continuity at loudspeaker
   [26], [27], [28] at each Ste-
   ward's station.
         |
       NOT OK
         |
   Replace faulty loudspeaker(s)
```

Chart 102

NO AUDIO SIGNAL AT PASSENGER COMPARTMENT OR TOILET LOUDSPEAKERS ONLY

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

Replace PA amplifier [1].

NOT OK

Check separately each transformer and associated passenger compartment and toilets loudspeakers and wiring (Ref. WDM 23-31-01, 23-31-12 to 23-31-16).

NOT OK

Replace faulty transformer [29] and/or faulty loudspeaker [30].

Chart 103

```
**************************************
* NO AUDIO SIGNAL AT ONE PASSENGER   *
* COMPARTMENT OR TOILET LOUDSPEAKER  *
* ONLY.                              *
**************************************

******************************************************
* Replace loudspeaker [30].                          *
******************************************************
                         |
                         |
                     NOT OK
                         |
                         |
------------------------------------------------------
| Replace transformer [29].                          |
------------------------------------------------------
```

Chart 104

```
**************************************
* NO RECEPTION AT PASSENGER COMPART- *
* MENT, TOILETS AND STEWARDS' STA-   *
* TIONS LOUDSPEAKERS.                *
**************************************

******************************************************
* Proceed with the same operations from other crew   *
* member's station.                                  *
******************************************************
                |           |
                |           |     --------------------------------
                |           |    | Replace audio selector panel |
            NOT OK          OK---| [3].                          |
                |                 --------------------------------
                |
                |
 ------------------------------------
| Replace PA amplifier [1].          |
 ------------------------------------
```

Chart 105

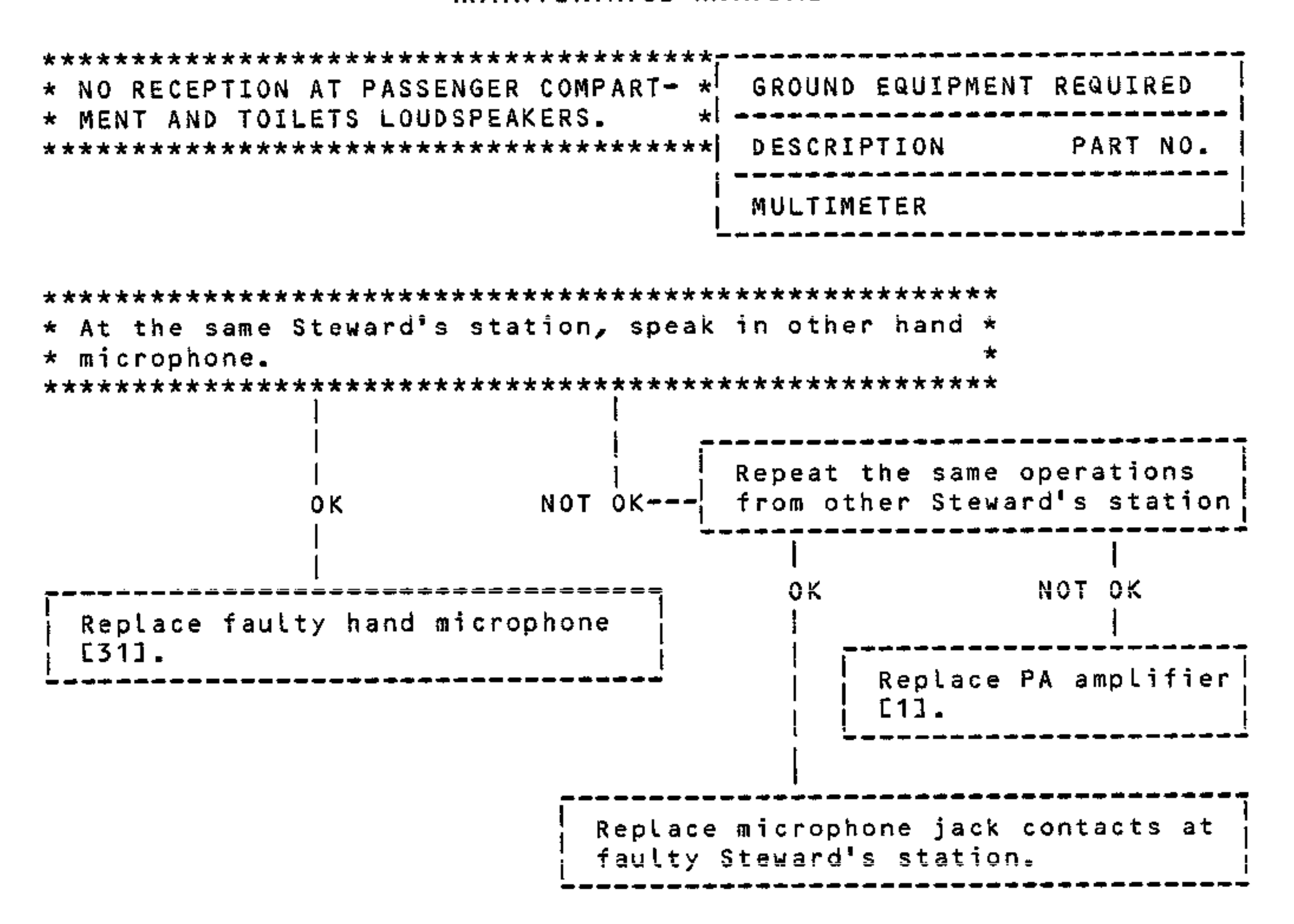

NO RECEPTION AT PASSENGER COMPART- MENT AND TOILETS LOUDSPEAKERS.
GROUND EQUIPMENT REQUIRED
DESCRIPTION
PART NO.
MULTIMETER
At the same Steward's station, speak in other hand microphone.
OK
NOT OK
Repeat the same operations from other Steward's station
Replace faulty hand microphone [31].
OK
NOT OK
Replace PA amplifier [1].
Replace microphone jack contacts at faulty Steward's station.

Chart 106

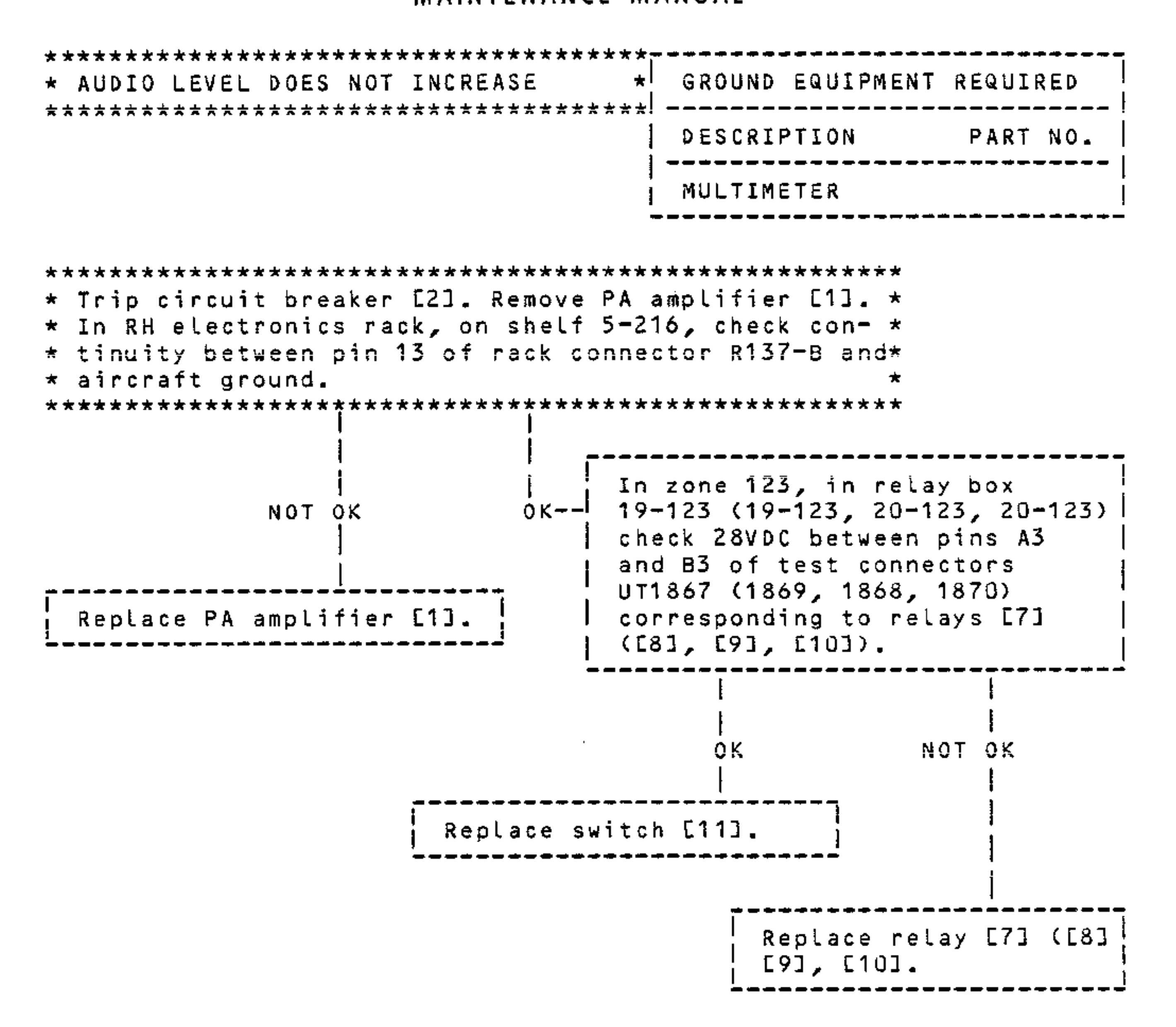

AUDIO LEVEL DOES NOT INCREASE
GROUND EQUIPMENT REQUIRED
DESCRIPTION
PART NO.
MULTIMETER
Trip circuit breaker [2]. Remove PA amplifier [1]. In RH electronics rack, on shelf 5-216, check continuity between pin 13 of rack connector R137-B and aircraft ground.
NOT OK
OK
Replace PA amplifier [1].
In zone 123, in relay box 19-123 (19-123, 20-123, 20-123) check 28VDC between pins A3 and B3 of test connectors UT1867 (1869, 1868, 1870) corresponding to relays [7] ([8], [9], [10]).
OK
NOT OK
Replace switch [11].
Replace relay [7] ([8] [9], [10].

Chart 107

R
R * PA AMPLIFIER OUTPUT AT MINIMUM LEVEL, DEPENDANT ON WHETHER ENGINES 'OFF' OR 'ON'. AT MACH 1 SYSTEM IS SATISFACTORY. *
R
R
R
R

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

R
R
R
R Trip CBs R139 and IF97 (A3 on panel 2-213) and remove PA amplifier. Check resistance across pins 1 and 2 on plug P1A is 900 ohms.
R
R
R
R
R
R NOT OK → Replace Potentiometer R152.
R
R
R NOT OK → Check continuity of wiring.
R
R
R OK → Replace PA amplifier [1].
R
R
R

Chart 107A

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```
***********************************
* PA AMPLIFIER OUTPUT AT MAXIMUM  *
* AT ALL TIMES.                   *
***********************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-
INSULATION RESISTANCE TESTER	-

Trip CBs R139 and IF97 (A3 on panel 2-213) and remove PA amplifier. Check resistance across pins 1 and 2 on plug P1A is 900 ohms.

OK

Locate and rectify short circuit in external gain potentiometer wiring. Ref. WDM 23-31-11.

NOT OK

Replace potentiometer R152.

Chart 107B

```
*************************************
* PA AMPLIFIER OUTPUT AT HIGH       *
* LEVEL AT ALL TIMES.               *
* 6 dBs DOWN WHEN ENGINES ARE OFF.  *
*************************************
```

GROUND EQUIPMENT	REQUIRED
DESCRIPTION	PART NO.
MULTIMETER	-

On panel 5-216, with relay de-energised, check relay R9051 [35] contacts are closed.

NOT OK → Replace relay R9051 [35].

OK → Check power supply to ADC amplifier.

- OK → Replace the ADC amplifier.
- NOT OK → Check continuity of wiring.

NOTE: It is acceptable to remove the 1.0 amp fuse (R9054) and set the external gain potentiometer to 800 ohms, until full rectification of the defect is made.

Chart 107C

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```
***********************************
* PA AMPLIFIER OUTPUT DOES NOT    *
* INCREASE AUTOMATICALLY ABOVE    *
* MACH 1.                         *
***********************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

Check	Result	Action
On shelf 5-216, check 100 ohm resistor (R9053).	NOT OK	Replace 100 ohm resistor (R9053).
OK ↓ Check continuity of wiring.	NOT OK	Repair wiring as necessary.
OK ↓ Check operation of relay R9051 [35].	NOT OK	Replace relay R9051 [35].
OK ↓ Check fuse R9054 [36].	NOT OK	Replace relay R9054 [36].
OK ↓ Check diode R9057 for open circuit.	NOT OK	Replace diode R9057.
OK ↓ Check continuity of wiring between relay R9051 splice and ADC amplifier.	NOT OK	Repair wiring as necessary.
OK ↓ Check continuity of wiring between TCAS processor pin 5 and the ADC amplifier pin G.	NOT OK	Repair wiring as necessary.

Chart 107D

```
************************************
* NEITHER HI NOR LO TONE IS HEARD  *
* AT LOUDSPEAKERS.                 *
************************************
```

GROUND EQUIPMENT	REQUIRED
DESCRIPTION	PART NO.
MULTIMETER	-

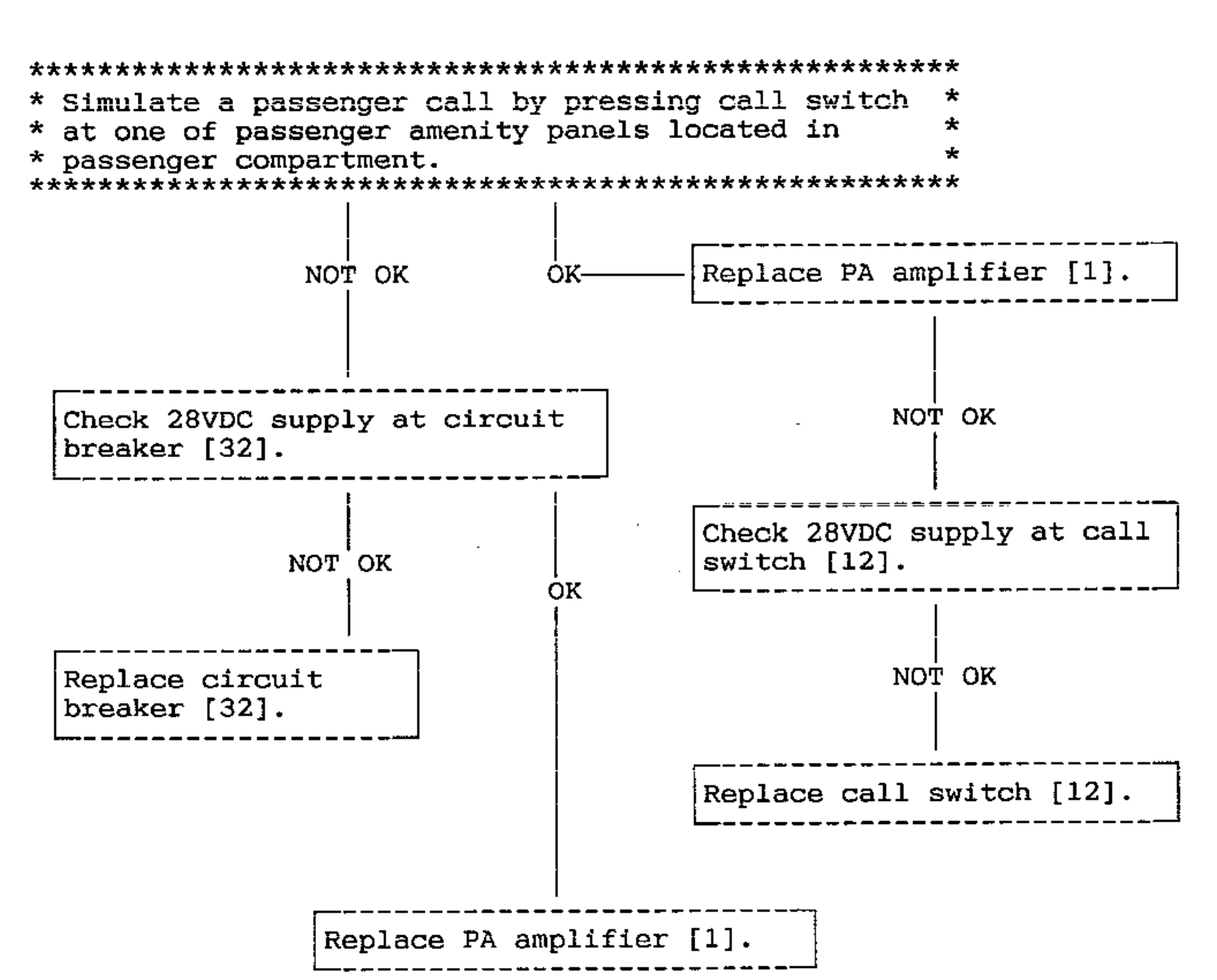


Chart 108

```
**************************************
* THE CHIME HI TONE IS NOT HEARD AT  *
* LOUDSPEAKERS.                      *
**************************************

*******************************************************
* Repeat the same operations from other passenger     *
* amenity panels.                                     *
*******************************************************
                  |           |
                  |           |      ---------------------------------
              NOT OK          OK-----| Replace faulty steward call   |
                  |                  | switch                        |
                  |                  ---------------------------------
                  |
---------------------------------
| Replace PA amplifier [1].     |
---------------------------------
```

Chart 109

LO TONE IS NOT HEARD AT THE LOUDSPEAKERS.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

FASTEN SEAT BELTS signs are illuminated when FASTEN SEAT BELTS switch is in ON position and extinguished when switch is in OFF position.

- NOT OK → Check 28VDC supply at circuit breaker [33].
  - NOT OK → Replace circuit breaker [33].
  - OK → Check 28VDC supply at switch [13].
    - NOT OK → Replace switch [13].
- OK → Replace PA amplifier [1].

Chart 110

```
****************************************
* LO TONE IS NOT HEARD AT THE LOUD-
* SPEAKERS.                            *
****************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

```
*******************************************************
* NO SMOKING signs are illuminated when NO SMKG       *
* switch is in ON position and extinguished when the *
* switch is in OFF position.                          *
*******************************************************
```

- NOT OK → Check 28VDC supply at circuit breaker [34].
  - NOT OK → Replace circuit breaker [34].
  - OK → Check 28VDC supply at switch [14].
    - NOT OK → Replace switch [14].
- OK → Replace PA amplifier [1].

Chart 111

```
*************************************----------------------------
* AUDIO LEVEL UNCHANGED WHEN ACTING  *| GROUND EQUIPMENT REQUIRED |
* ON POTENTIOMETER [15] OR [16].     *| ------------------------- |
**************************************| DESCRIPTION      PART NO. |
                                      | ------------------------- |
                                      | MULTIMETER                |
                                      -----------------------------

*****************************************************
* Check operation of slider and resistor of potentio-*
* meter [15] and/or [16]. The total resistance of    *
* each potentiometer is 2200 ohms.                   *
*****************************************************
          |           |
          |           |
     NOT OK           OK-----| Replace PA amplifier [1]. |
          |
          |
----------------------------------
| Replace faulty potentiometer   |
| [15] and/or [16].              |
----------------------------------
```

Chart 112

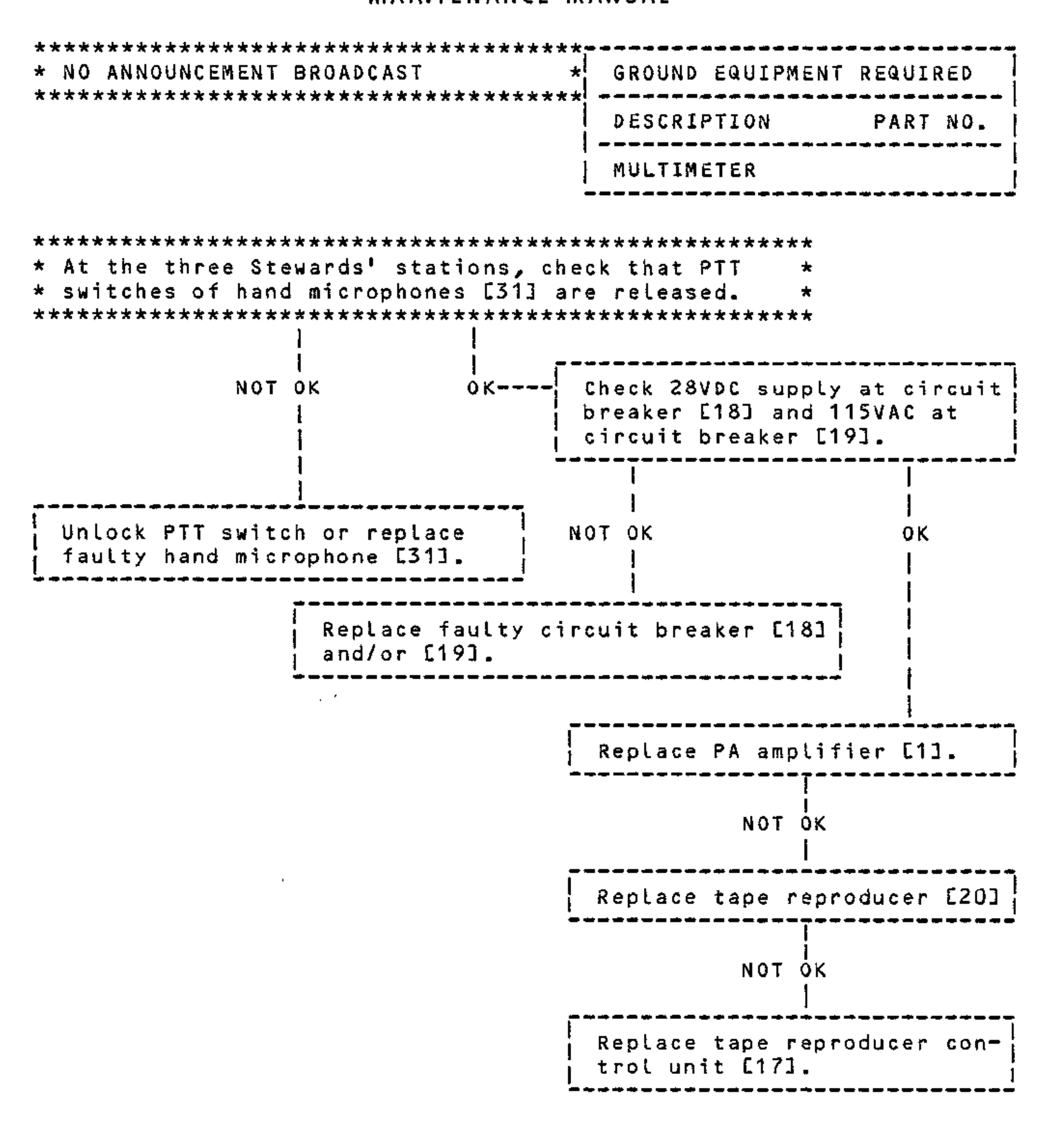

NO ANNOUNCEMENT BROADCAST
GROUND EQUIPMENT REQUIRED
DESCRIPTION
PART NO.
MULTIMETER
At the three Stewards' stations, check that PTT switches of hand microphones [31] are released.
NOT OK
OK
Check 28VDC supply at circuit breaker [18] and 115VAC at circuit breaker [19].
Unlock PTT switch or replace faulty hand microphone [31].
NOT OK
OK
Replace faulty circuit breaker [18] and/or [19].
Replace PA amplifier [1].
NOT OK
Replace tape reproducer [20]
NOT OK
Replace tape reproducer control unit [17].

Chart 113

```
*************************************
* ONLY A FEW ANNOUNCEMENTS ARE NOT  *
* BROADCAST. CANCEL FUNCTION INOPE- *
* RATIVE.                           *
*************************************

*****************************************************
* Replace tape reproducer [20].                     *
*****************************************************
                          |
                       NOT OK
                          |
-----------------------------------------------------
| Replace tape reproducer control unit [17].        |
-----------------------------------------------------
```

Chart 114

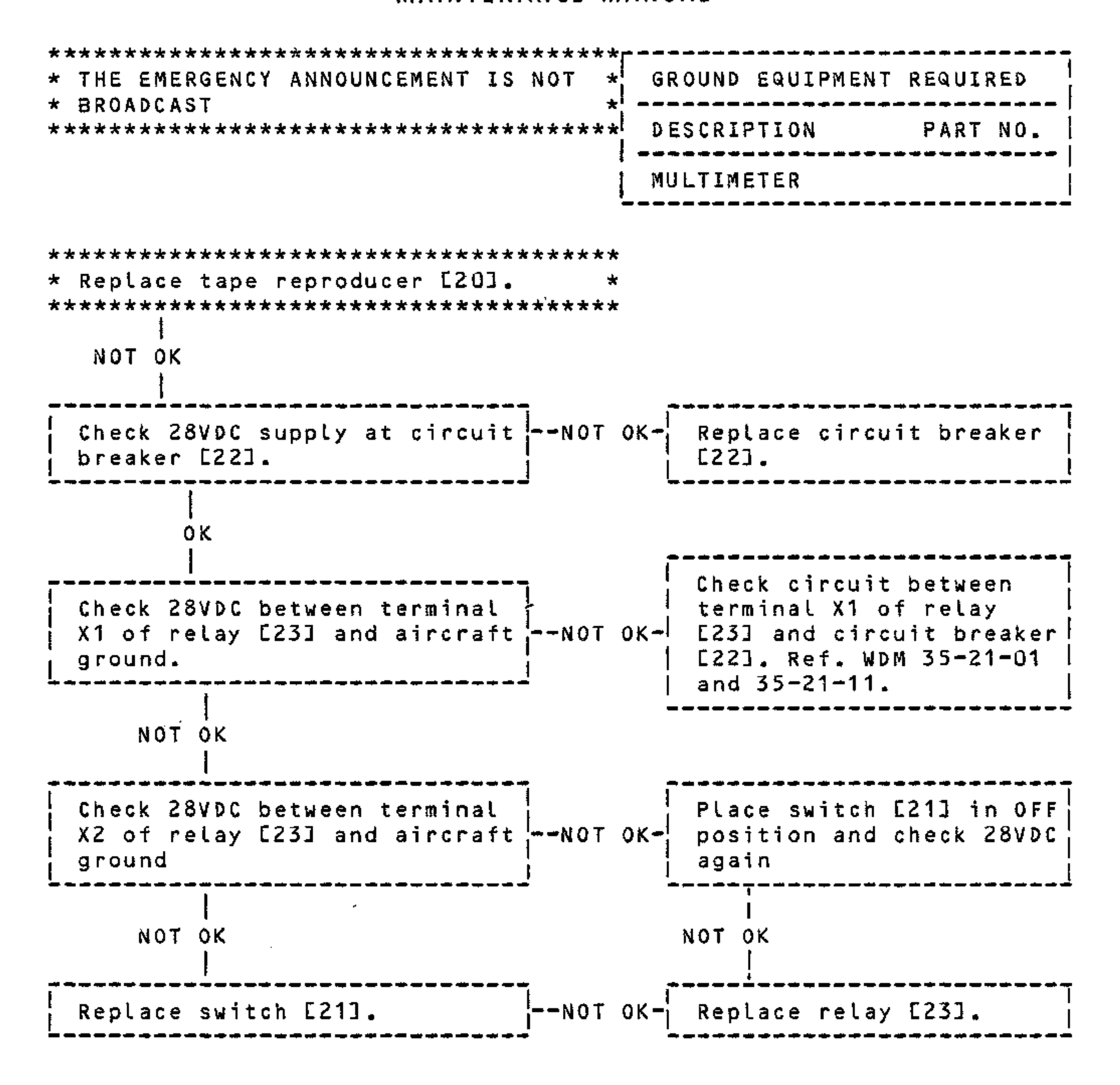

THE EMERGENCY ANNOUNCEMENT IS NOT BROADCAST
GROUND EQUIPMENT REQUIRED
DESCRIPTION
PART NO.
MULTIMETER
Replace tape reproducer [20].
NOT OK
Check 28VDC supply at circuit breaker [22].
NOT OK
Replace circuit breaker [22].
OK
Check 28VDC between terminal X1 of relay [23] and aircraft ground.
NOT OK
Check circuit between terminal X1 of relay [23] and circuit breaker [22]. Ref. WDM 35-21-01 and 35-21-11.
NOT OK
Check 28VDC between terminal X2 of relay [23] and aircraft ground
NOT OK
Place switch [21] in OFF position and check 28VDC again
NOT OK
NOT OK
Replace switch [21].
NOT OK
Replace relay [23].

Chart 115

```
*************************************
* NO MUSIC BROADCAST FOR ANY POSITION*
* OF BGM SELECTOR SWITCH.
*************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

```
******************************************************
* Trip circuit breakers [18] and [19]. Remove tape   *
* reproducer [20]. On rack connector R245-A, check   *
* continuity between pins 5 and 4.                   *
******************************************************
```

NOT OK → Replace switch [25].

OK → Replace tape reproducer [20]

Chart 116

```
**************************************
* MUSIC AUDIO LEVEL UNCHANGED WHEN   *
* ACTING ON VOLUME POTENTIOMETER [24]*
**************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

```
******************************************************
* Check operation of slider and resistor of potentio-*
* meter [24]. The total resistance of the potentio-  *
* meter is 10 Kohms.                                 *
******************************************************
              |                        |
           NOT OK                      OK
              |                        |
 Replace potentiometer [24].    Replace tape reproducer [20]
```

Chart 117

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[1] Public address amplifier	216ES	5-216	R127	RH electronics rack	23-31-33 R/I	23-31-01 23-31-11
[2] Circuit breaker, 28VDC		1-213	R139	Map Ref. K 20	24-50-00 R/I	23-31-01 23-31-11
[3] Captain's Audio Selector Panel		7-211	R 53	Flight Compartment	23-00-00 R/I	23-51-01 23-31-11
[4] First Officer's audio selector panel		7-211	R 54	Flight Compartment	23-00-00 R/I	23-51-01 23-31-11
[5] Flight Engineer's audio selector panel		8-214	R 56	Flight Compartment	23-00-00 R/I	23-51-01 23-31-11
[6] 1st Supernumerary Audio Selector panel		7-213	R 55	Flight Compartment	23-00-00 R/I	23-51-01 23-31-11
[7] HP Valve Relay, ENG1	123BB	19-123	1K133	Relay Box LH engines	73-13-00 R/I	73-21-11 23-31-11
[8] HP Valve Relay, ENG2	123BB	19-123	2K133	Relay Box LH engines	73-13-00 R/I	73-21-12 23-31-11
[9] HP Valve Relay, ENG3	123BB	20-123	3K133	Relay Box, RH engines	73-13-00 R/I	73-21-13 23-31-11
[10] HP Valve Relay, ENG4	123BB	20-123	4K133	Relay Box, RH engines	73-13-00 R/I	73-21-14 23-31-11
[11] HP Valve Control Switch		4-211	1K132 to 4K132	Overhead Panel	73-xx-xx R/I	73-21-11 73-21-14
[12] STEWARD CALL Indicator Light/Switch		4-211	M 79	Overhead Panel	33-00-00 R/I	23-31-11 33-27-11

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[13] FASTEN SEAT BELTS Switch		4-211	W193	Overhead Panel	33-25-00 R/I	33-25-11 23-31-01
[14] NO SMKG Switch		4-211	W194	Overhead Panel	33-25-00 R/I	33-25-11 23-31-01
[15] VOLUME Potentiometer	216AS 216BS	11-216	R152	RH Electronics rack	23-00-00 R/I	23-31-01 23-31-11
[16] Sensitivity Potentiometer	216AS 216BS	11-216	R153	RH electronics rack	23-00-00 R/I	23-31-01 23-31-11
[17] Tape Reproducer Control Unit		221	R246	Fwd Steward's station	23-31-34 R/I	23-31-05
[18] Circuit Breaker, 28VDC		1-213	R248	Map Ref. L 19	24-50-00 R/I	23-31-05
[19] Circuit Breaker, 115VAC		2-213	R247	Map Ref. G 21	24-50-00 R/I	23-31-05
[20] Tape Reproducer		221	R245	Fwd Steward's station	23-31-34 R/I	23-31-05
[21] Passenger System Emerg Manual O/Ride Switch		7-214	H1238	Flight Engineer's Console	35-21-00 R/I	35-21-01
[22] Circuit Breaker, 28 VDC		1-213	H1231	Map Ref. C 11	24-50-00 R/I	35-21-01
[23] Relay Emergency Oxy Serv		1-221	H1240	Fwd Steward's station	35-21-00 R/I	35-21-01

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[24] VOLUME Potentiometer		1-221	R250	Fwd Steward's station	23-00-00 R/I	23-31-05
[25] Tape reproducer Control Switch		1-221	R249	Fwd Steward's station	33-20-00 R/I	23-31-05
[26] Loudspeaker		2-221	R150	Fwd Steward's station	23-31-32 R/I	23-31-18
[27] Loudspeaker		1-223	R154	Mid Steward's station	23-31-32 R/I	23-31-18
[28] Loudspeaker		1-241	R156	Aft Steward's station	23-31-32 R/I	23-31-18
[29] Loudspeaker transformer		221 to 224 231 to 234 241 242		Passenger Compartment, toilets	23-31-31 R/I	23-31-01 23-31-12 23-31-16
[30] Loudspeaker		221 to 224 231 to 234 241 242		Passenger Compartment, toilets	23-31-31 R/I	23-31-01 23-31-12 23-31-16
[31] Hand Microphone		2-221 2-223 2-241	R146 R151 R158	Fwd, mid and aft Steward's stations		23-31-01 23-31-11 23-31-12 23-31-17
[32] Circuit Breaker, 28VDC		15-216	M 78	Map Ref. A 22	24-50-00 R/I	23-31-01 33-27-11
[33] Circuit Breaker, 28VDC		1-213	W191	Map Ref. L 8	24-50-00 R/I	23-31-01 33-25-11

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[34] Circuit Breaker, 28VDC		1-213	W192	Map Ref. L 9	24-50-00 R/I	23-31-01 33-25-11
RB RB RB [35] Relay		5-216	R9051	RH Electronic Rack	23-31-00	23-31-11
RB RB RB [36] Fuse		5-216	R9054	RH Electronic Rack	23-31-00	23-31-11

Component Identification
Table 101

PUBLIC ADDRESS - TROUBLE SHOOTING

WARNING : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the public address system to be quickly rectified.
The defects can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.
Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information including component location, required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
4 Boomsets	Aircraft Equipment
3 Hand Microphones	Aircraft Equipment
5 Circuit Breaker Safety Clips	

B. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

C. Operate electronics rack ventilation (Ref. 21-21-00)

D. Remove access panels 216AS, 216BS and 216ES.

E. On Captain's and First Officer's control column handwheels, press RAD-INT PTT switches in intermediate position.

F. On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(1) All keys on keyboard are disengaged

(2) All reception push-buttons are disengaged

(3) The INT R/T PTT switch is in intermediate position

(4) The VOICE push-button is disengaged

G. On Captain's, First Officer's, Flight Engineer's and First Supernumerary's jack panels.

(1) Connect a boomset to HEADSET and MIC jacks.

(2) Place BOOM-MASK switch in BOOM position.

H. At all Stewards' stations, make certain that the hand microphones are in place.

I. On overhead panel 4-211, make certain that :

(1) FASTEN SEAT BELTS switch is in OFF position

(2) NO SMKG switch is in OFF position

(3) STEWARD CALL indicator light/switch is disengaged

J. At Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

K. At Forward Steward's station (in zone 221), make certain that :

(1) On panel 1-221 PASS STEREO switch is in OFF position.

(2) Announcement and music magazines are in place in the tape reproducer.

(3) On tape reproducer control unit, VOLUME/OFF button is in OFF position.

L. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 2 HP VALVE CONT	1-213	2K 131	C 3
ENG 3 HP VALVE CONT		3K 131	C 4

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMERG PASS OXY CONT & IND		H1231	C11
NO.1 INPH SUP		R 89	K19
PA SUP		R 139	K20
FASTEN S/BELTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21
ENG1 HP VALVE CONT	3-213	1K 131	C 1
ENG 4 HP VALVE CONT		4K 131	C 2
NO.2 INPH SUP		R 90	H 2
PASS CALL SUP	15-216	M 78	A22

M. Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMERG PASS OXY CONT	1-213	H1232	C10
NO.1 PROBE HTR SUP	13-215	1H 542	C 9
NO.2 PROBE HTR SUP	14-215	2H 542	E 8
NO.4 PROBE HTR SUP	13-216	4H 542	C11
NO.3 PROBE HTR SUP	14-216	3H 542	C14

3. Trouble Shooting

```
****************************************************
* Check PA amplifier self-test function            *
*                                                  *
* 1. On shelf 5-216 of RH electronics rack, place  *
*    SPKR TEST-NORM-AMP TEST selector switch located *
*    on front panel of amplifier [1] in AMP TEST   *
*    position :                                    *
*    - The pointer of amplifier VU-meter should de- *
*      flect and read "0"                          *
*                                                  *
* 2. Place SPKR TEST-NORM-AMP TEST selector switch *
*    in SPRK TEST position :                       *
*    - An audio signal is heard at all passenger   *
*      compartment, toilets and Stewards' stations *
*      loudspeakers. IF                            *
****************************************************
     ||     |
     ||     |      ---------------------------------------------------
     OK     NOT OK--| VU-meter pointer neither deflects nor reads "0"|
     ||     |       | Ref. Chart 101                                 |
     ||     |      ---------------------------------------------------
     ||     |
     ||     |      ---------------------------------------------------
     OK     NOT OK--| VU-meter pointer deflects but does not read "0"|
     ||     |       | Replace PA amplifier [1].                      |
     ||     |      ---------------------------------------------------
     ||     |
     ||     |      ---------------------------------------------------
     OK     NOT OK--| No audio signal at passenger compartment, toi- |
     ||     |       | lets and Stewards' stations loudspeakers.      |
     ||     |       | Replace PA amplifier [1].                      |
     ||     |      ---------------------------------------------------
     ||     |
     ||     |      ---------------------------------------------------
     ||     |       | No audio signal at one passenger compartment,  |
     OK     NOT OK--| toilets or Steward's station loudspeaker.      |
     ||             | Ref. Chart 102.                                |
     ||            ---------------------------------------------------
     ||
     ||
```

```
****************************************************
* Announcements made by the crew members           *
*                                                  *
* 1. On audio selector panels [3], [4], [5] and [6]: *
*    - engage PA key                               *
*    - make certain that BOOM-MASK switch is in BOOM *
*      position.                                   *
*                                                  *
* 2. Place and hold INT-R/T PTT switch on Captain's *
*    audio selector panel in R/T position and speak *
*    in boomset microphone :                       *
*    - check reception at passenger compartment,   *
*      toilets and Stewards' stations loudspeakers *
*    - check reception at boomsets on First        *
*      Officer's, Flight Engineer's and First      *
*      Supernumerary's jack panels.  IF            *
****************************************************
```

OK — NOT OK — No reception at passenger compartment, toilets and Stewards' stations loudspeakers. Ref. Chart 103.

OK — NOT OK — Reception at passenger compartment, toilets and Stewards' stations loudspeakers. No reception at one/all three First Officer's, Flight Engineer's and First Supernumerary's boomsets. Ref. 23-41-00, Trouble Shooting.

```
****************************************************
* Announcements made by Stewards                   *
*                                                  *
* At one Steward's station, speak in hand microphone *
* while holding PTT switch pressed:                *
* - check reception in passenger compartment, toilets*
*   and Stewards' stations loudspeakers.  IF       *
****************************************************
```

OK — NOT OK — No reception at passenger compartment, toilets and Stewards' stations loudspeakers. Ref. Chart 104.

R NOT OK — Loss of PA facility from the Stewards'
R microphones. Ref. Chart 104A.

```
*************************************************
* Priority of crew member's messages            *
*                                               *
* 1. At one Steward's station, speak in hand    *
*    microphone while holding PTT switch pressed.*
*    - check reception at passenger compartment  *
*      and toilets loudspeakers.                *
*                                               *
* 2. From a crew member's audio selector panel, *
*    speak in boomset microphone while holding  *
*    INT-RADIO PTT switch on audio selector     *
*    panel in RADIO position.                   *
*    - check that crew member's message replaces *
*      Steward's message.                    IF *
*************************************************
     ||     |
     ||     |
     OK     NOT OK --|Replace PA amplifier [1].|
     ||     |

*************************************************
* Check attenuation using HP VALVES switches    *
* 1, 2, 3 and 4                                 *
*                                               *
* 1. On fuel panel 5-214, make certain that the *
*    four LP VALVE switches are in SHUT 1       *
*    position.                                  *
*                                               *
* 2. On panel 4-211, make certain that HP VALVE *
*    switches 1, 2, 3 and 4 are in SHUT position *
*    and the four engine shut down handles are  *
*    pushed (normal position).                  *
*                                               *
* 3. From one Steward's station, speak in hand  *
*    microphone while holding PTT switch pressed:*
*    - appreciate the audio level at passenger  *
*      compartment and toilets loudspeakers.    *
*                                               *
* 4. On panel 4-211, place HP VALVE switch 1    *
*    (2,3,4) in OPEN position:                  *
*    - the audio level increases at passenger   *
*      compartment and toilets loudspeakers.  IF*
*************************************************
     ||     |
     OK     NOT OK --|Audio level does not increase. Ref. Chart 105.|
     ||     |
```

NOT OK — PA amplifier output at minimum level, dependent on whether engines OFF or ON. At Mach 1 System is satisfactory. Ref. Chart 105A.

NOT OK — PA amplifier at maximum at all times. Ref. Chart 105B.

NOT OK — PA amplifier at high level at all times. 6dBs down when engines are off. Ref. Chart 105C.

NOT OK — Possible damage and loss of keyline facility to passenger entertainment amplifier. Ref. Chart 105D.

NOT OK — Loss of muting facility Post Mod 23F141. Ref. Chart 105E.

NOT OK — Stewards' speakers continuously muted. Ref. Chart 105F.

```
*****************************************************
* On panel 1-213 trip circuit breaker W513.         *
* Switch on air data computer and carry out an ADC  *
* Self Test 2 (34-11-41, Adjustment/Test):          *
* - the audio level increases at passenger          *
*   compartment and toilets loudspeakers.       IF  *
*****************************************************
```

OK

NOT OK — PA amplifier output does not increase automatically above Mach 1. Ref. Chart 105G.

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```
****************************************************
* Captain-to-Steward Call                          *
*                                                  *
* 1. On panel 4-211, press STEWARD CALL indicator  *
*    light/switch [12]:                            *
*    - At Stewards' stations, FLIGHT DECK CALL indi-*
*      cator lights illuminate.                    *
*    - The call overhead indicator lights illuminate *
*      above passenger compartment aisle.          *
*    - The chime HI-LO tone is heard at passenger  *
*      compartment, toilets and Stewards' stations *
*      loudspeakers.                               *
*                                                  *
* 2. At one Steward's station, press FLIGHT DECK   *
*    CANCEL push-button :                          *
*    - FLIGHT DECK CALL indicator lights at the    *
*      three Stewards' stations and the call       *
*      overhead indicator lights extinguish. IF    *
****************************************************
      ||      |
      ||      |        ---------------------------------------------------
      ||      |       | Either HI or LO tone is heard at loudspeakers. |
      OK     NOT OK--| Replace PA amplifier [1]                       |
      ||      |        ---------------------------------------------------
      ||      |
      ||      |        ---------------------------------------------------
      ||      |       | Neither HI nor LO tone is heard at loudspeakers|
      OK     NOT OK--| Ref. Chart 106.                                |
      ||      |        ---------------------------------------------------
      ||      |
      ||      |        ---------------------------------------------------
      ||      |       | FLIGHT DECK CALL indicator lights at Stewards' |
      ||      |       | stations or the call overhead indicator lights |
      OK     NOT OK--| do not illuminate.                             |
      ||              | Ref. 33-27-00, Trouble Shooting                |
      ||               ---------------------------------------------------
      ||
```

```
****************************************************
* Passenger-to-Steward Call                        *
*                                                  *
* 1. On one of the passenger amenity panels in the *
*    passenger compartment (in zone 221), press    *
*    Steward call indicator light/switch :         *
*    - This indicator light/switch illuminates     *
*    - At Stewards' stations in zones 221 and 223, *
*      FWD CABIN indicator lights illuminate       *
*    - Call overhead indicator lights illuminate   *
B*   - (DELETED CM 42018)                          *
*                                                  *
* 2. Press again the Steward call indicator light/ *
*    switch :                                      *
*    - This indicator light/switch extinguishes    *
*    - The FWD CABIN indicator lights at Stewards' *
*      stations and the call overhead indicator    *
*      lights extinguish. IF                       *
****************************************************
    ||     |
    ||     |      ---------------------------------------------------
    ||     |     | The chime HI tone is not heard at loudspeakers.|
    OK     NOT OK--| Ref. Chart 107. (Not used for tonesignal).   |
    ||     |      ---------------------------------------------------
    ||     |
    ||     |      ---------------------------------------------------
    ||     |     | FWD CABIN indicator lights at Stewards' sta-    |
    ||     |     | tions or the call overhead indicator lights     |
    OK     NOT OK--| do not illuminate                             |
    ||           | Ref. 33-27-00, Trouble Shooting                 |
    ||            ---------------------------------------------------
    ||
```

```
***************************************************
* FASTEN SEAT BELTS signs                          *
*                                                  *
* 1.  On panel 4-211, place FASTEN SEAT BELTS switch *
*     [13] in ON position :                        *
*     - FASTEN SEAT BELTS signs in passenger compart-*
*       ment and at Stewards' stations illuminate  *
*     - RETURN TO CABIN signs illuminate in toilets *
*     - The chime LO tone is heard at passenger comp-*
*       artment, toilets and Stewards' stations loud-*
*       speakers.                                  *
*                                                  *
* 2. Place switch [13] in OFF position :           *
*    - The chime LO tone is heard again at the loud- *
*      speakers                                    *
*    - FASTEN SEAT BELTS signs extinguish          *
*    - RETURN TO CABIN signs extinguish. IF        *
***************************************************
      ||     |
      ||     |      ----------------------------------------------
      ||     |     | LO tone is heard only for ON or OFF position of|
      OK     NOT OK--| switch [13]. Replace PA amplifier [1].     |
      ||     |      ----------------------------------------------
      ||     |
      ||     |      ----------------------------------------------
      ||     |     | LO tone is not heard at the loudspeakers.    |
      OK     NOT OK--| Ref. Chart 108                             |
      ||     |      ----------------------------------------------
      ||     |
      ||     |      ----------------------------------------------
      ||     |     | LO tone is heard at the loudspeakers but FASTEN|
      ||     |     | SEAT BELTS or RETURN TO CABIN signs do not   |
      OK     NOT OK--| illuminate.                                |
      ||           | Ref. 33-25-00, Trouble Shooting              |
      ||            ----------------------------------------------
      ||
      ||
```

```
*******************************************************
* NO SMOKING signs                                    *
*                                                     *
* 1. On panel 4-211, place NO SMKG switch [14] in ON  *
*    position                                         *
*    - NO SMOKING signs in passenger compartment and  *
*      stewards' stations illuminate                  *
*    - The chime LO tone is heard at passenger comp-  *
*      artment, toilets and Stewards' stations loud-  *
*      speakers.                                      *
*                                                     *
* 2. Place switch [14] in OFF position                *
*    - The chime LO tone is heard again at the loud-  *
*      speakers                                       *
*    - NO SMOKING SIGNS extinguish. IF                *
*******************************************************
    ||     |
    ||     |     -------------------------------------------------
    ||     |     | LO tone is heard only for ON or OFF position  |
    OK     NOT OK--| of switch [14]                              |
    ||     |     | Replace PA amplifier [1].                     |
    ||     |     -------------------------------------------------
    ||     |
    ||     |     -------------------------------------------------
    ||     |     | LO tone is not heard at the loudspeakers.     |
    OK     NOT OK--| Ref. Chart 109                              |
    ||     |     -------------------------------------------------
    ||     |
    ||     |     -------------------------------------------------
    ||     |     | LO tone is heard at the loudspeakers but NO   |
    OK     NOT OK--| SMOKING signs do not illuminate             |
    ||           | Ref. 33-25-00, Trouble Shooting               |
    ||           -------------------------------------------------
    ||
```

```
*****************************************************
* Adjustment of PA amplifier output level           *
*                                                   *
* 1. At forward Steward's station, speak in hand    *
*    microphone while holding PTT switch pressed.   *
*                                                   *
* 2. When speaking in microphone, turn VOLUME poten- *
*    tiometer [15] and sensitivity potentiometer    *
*    [16] located in RH electronics rack            *
*    (11-216) clockwise and counterclockwise.       *
*    - the audio level at loudspeakers should in-   *
*      crease and decrease successively. IF         *
*****************************************************
    ||     |
    ||     |       -----------------------------------------------
    ||     |      | Audio level unchanged when acting on potentio- |
    OK    NOT OK--| meter [15] or [16]. Ref. Chart 110.            |
    ||             -----------------------------------------------
    ||
*****************************************************
* Broadcasting of pre-recorded announcement.        *
* (NOTE : Procedure described for announcement 2 ;  *
* repeat same procedure for announcement 3 to 12).  *
*                                                   *
* 1. On tape reproducer control unit [17] at forward *
*    Steward's station, press push-button to select *
*    announcement 2.                                *
*    - WAIT caption light corresponding to selected *
*      magazine illuminates                         *
*    - The announcement is broadcast at passenger   *
*      compartment, toilets and Stewards' stations  *
*      loudspeakers.                                *
*                                                   *
* 2. On tape reproducer control unit [17], press    *
*    CANCEL push-button :                           *
*    - The announcement stops. IF                   *
*****************************************************
    ||     |
    ||     |       -----------------------------------------------
    OK    NOT OK--| No announcement broadcast. Ref. Chart 111.     |
    ||     |       -----------------------------------------------
    ||     |
    ||     |       -----------------------------------------------
    ||     |      | Only a few announcements are not broadcast.    |
    OK    NOT OK--| CANCEL function inoperative. Ref. Chart 112.   |
    ||             -----------------------------------------------
    ||
```

```
*****************************************************
* Broadcasting of emergency announcement in auto-   *
* matic control mode                                *
*                                                   *
* 1. On panel 1-215, make certain that EMERG PASS   *
*    OXY CONT circuit breaker H1232 (C10) is trip-  *
*    ped, safetied and tagged.                      *
*                                                   *
* 2. On tape reproducer control unit [17], press    *
*    push-button to select announcement 5 to 12.    *
*    - The selected announcement is broadcast at    *
*      passenger compartment, toilets and Stewards' *
*      stations loudspeakers.                       *
*                                                   *
* 3. While selected announcement is broadcast, place *
*    PASSENGER SYSTEM EMERG MANUAL O/RIDE switch    *
*    [21] located on panel 7-214 in ON position.    *
*    - WAIT caption light corresponding to announce- *
*      ment 1 to 4 illuminates.                     *
*    - at the loudspeakers, the announcement in pro- *
*      gress is replaced by the emergency announce- *
*      ment (which has a top priority). IF          *
*****************************************************
     ||     |
     ||     |     -------------------------------------------------
     ||     |     | The emergency announcement is not broadcast.  |
     OK     NOT OK--| Ref. Chart 113.                             |
     ||     |     -------------------------------------------------
     ||     |
     ||     |     -------------------------------------------------
     ||     |     | The emergency announcement is broadcast but it |
     OK     NOT OK--| does not replace the announcement in progress. |
     ||           | Replace tape reproducer [20].                 |
     ||           -------------------------------------------------
     ||
```

```
******************************************************
* Broadcasting of emergency announcement in manual   *
* control mode.                                      *
*                                                    *
* 1. On tape reproducer control unit [17], press     *
*    push-button to select announcement 1.           *
*    - WAIT caption light corresponding to announce- *
*      ment 1 to 4 illuminates.                      *
*    - the emergency announcement is broadcast at    *
*      passenger compartment, toilets and Stewards'  *
*      stations loudspeakers.                        *
*                                                    *
* 2. On tape reproducer control unit [17], press     *
*    CANCEL push-button :                            *
*    - The emergency announcement stops. IF          *
******************************************************
     ||     |
     ||     |      ------------------------------------------------
     ||     |     | The emergency announcement is not broadcast.  |
    OK     NOT OK--| CANCEL function inoperative. Ref. Chart 114.  |
     ||            ------------------------------------------------
     ||
******************************************************
* Broadcasting of music to passengers                *
*                                                    *
* 1. At forward Steward's station, on tape reprodu-  *
*    cer control unit [17] turn VOLUME button clock- *
*    wise to intermediate position.                  *
*    - Music is broadcast at passenger compartment,  *
*      toilets and Stewards' stations loudspeakers   *
*                                                    *
* 2. On tape reproducer control unit [17], turn VO-  *
*    LUME button clockwise and counterclockwise.     *
*    - The audio level of music broadcast at the     *
*      loudspeakers increases and decreases success- *
*      ively. IF                                     *
******************************************************
     ||     |
     ||     |      ------------------------------------------------
     ||     |     | Music is not broadcast. Music audio level un-  |
    OK     NOT OK--| changed when acting on VOLUME button.         |
     ||           | Ref. Chart 115.                                |
     ||            ------------------------------------------------
     ||
```

```
*****************************************************
* Priority of Stewards' messages over pre-recorded  *
* announcements.                                    *
*                                                   *
* 1. On tape reproducer control unit [17] select    *
*    any one announcement from 2 to 12.             *
*    - The selected announcement is broadcast at the *
*      loudspeakers.                                *
*    - The WAIT caption corresponding to selected   *
*      announcement illuminates.                    *
*                                                   *
* 2. While selected announcement is broadcast, speak *
*    in microphone at a Steward's station, pressing *
*    PTT switch :                                   *
*    - The announcement stops and is replaced by    *
*      Steward's message at loudspeakers. IF        *
*****************************************************
    ||     |
    ||     |      ------------------------------------------------
    ||     |     | Steward's message does not replace pre-recorded|
    OK    NOT OK--| announcement. Replace PA amplifier [1].        |
    ||            ------------------------------------------------
    ||
*****************************************************
* Priority of announcements over music              *
*                                                   *
* 1. At forward Steward's station, on control unit  *
*    [17] turn VOLUME button up to intermediate posi-*
*    tion :                                         *
*    - Music is broadcast at the loudspeakers.      *
*                                                   *
* 2. While music is broadcast, on control unit [17] *
*    select any one announcement from 2 to 12.      *
*    - Music program in progress stops and is re-   *
*      placed at loudspeakers by selected announce- *
*      ment. IF                                     *
*****************************************************
    ||     |
    ||     |      ------------------------------------------------
    OK    NOT OK--| The announcement does not replace music.       |
    ||           | Replace tape reproducer [20].                  |
    ||            ------------------------------------------------
    ||
*****************************************************
* Public address system is serviceable.             *
*****************************************************
```

```
**************************************----------------------------------
* VU-METER POINTER NEITHER DEFLECTS  *| GROUND EQUIPMENT REQUIRED      |
* NOR READS "0"                      *|--------------------------------|
**************************************| DESCRIPTION          PART NO.  |
                                      |--------------------------------|
                                      | MULTIMETER                     |
                                      ----------------------------------

*****************************************************
* Check 28VDC supply at circuit breaker [2].        *
*****************************************************
          |                  |
          |                  |       ------------------------------
       NOT OK                OK------| Replace PA amplifier [1].  |
          |                          ------------------------------
----------------------------------
| Replace circuit breaker [2].   |
----------------------------------
```

Chart 101

```
***************************************
* NO AUDIO SIGNAL AT ONE PASSENGER    *
* COMPARTMENT, TOILETS OR STEWARD'S   *
* STATION LOUDSPEAKER.                *
***************************************

*******************************************************
* Replace loudspeaker [25].                           *
*******************************************************
                          |
                          |
                        NOT OK
                          |
                          |
-------------------------------------------------------
| Replace loudspeaker transformer [24].               |
-------------------------------------------------------
```

Chart 102

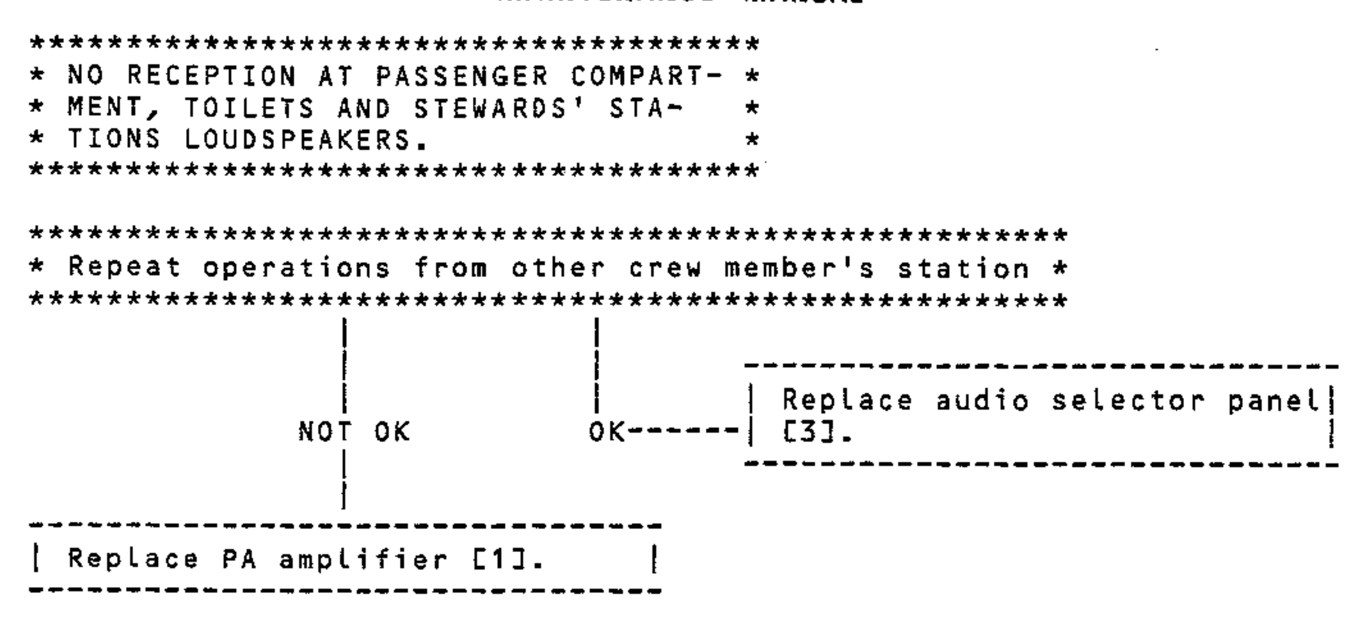


Chart 103

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```
**************************************---------------------------------
* NO RECEPTION AT PASSENGER COMPART- *| GROUND EQUIPMENT REQUIRED      |
* MENT, TOILETS AND STEWARDS' STA-   *|--------------------------------|
* TIONS LOUDSPEAKERS.                *| DESCRIPTION        PART NO.    |
**************************************|--------------------------------|
                                      | MULTIMETER                     |
                                      ---------------------------------

****************************************************
* At the same Steward's station, speak in other    *
* microphone.                                      *
****************************************************
             |       |
             |       |     ---------------------------------
             |       |     | Repeat operations from other|
            OK    NOT OK-------| Steward's station.           |
             |             ---------------------------------
             |                    |            |
----------------------------------  OK          NOT OK
| Replace faulty hand microphone |   |            |
| [26].                          |   |      ------------------------
----------------------------------   |      | Replace PA amplifier|
                                     |      | [1].                |
                                     |      ------------------------
                                     |
                         -------------------------------------------
                         | Check microphone jack contacts at faulty |
                         | Steward's station.                       |
                         -------------------------------------------
```

Chart 104

****
* LOSS OF PA FACILITY FROM THE *
* STEWARDS' MICROPHONES. *
****

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

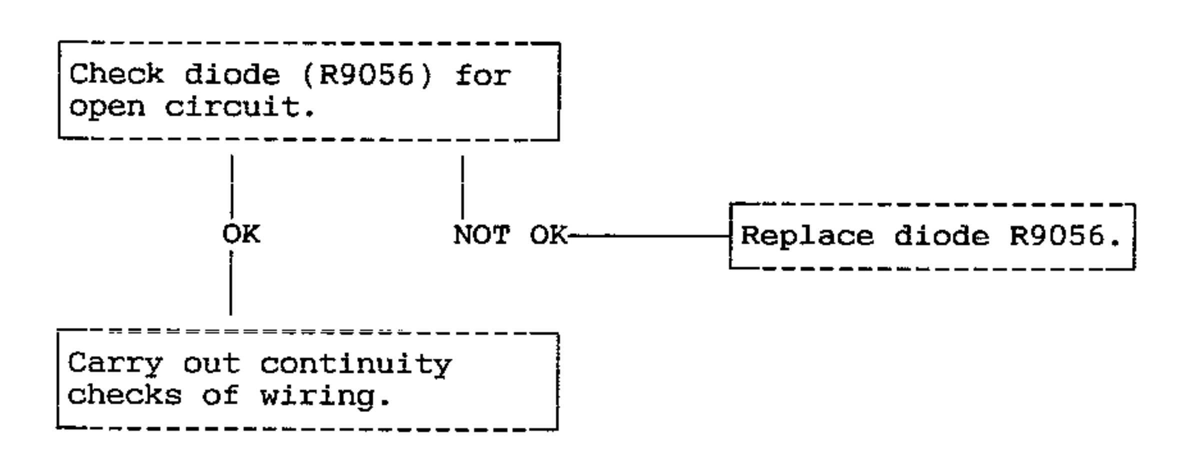


Chart 104A

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AUDIO LEVEL DOES NOT INCREASE

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.

Trip circuit breaker [2]. Remove PA amplifier [1]. In RH electronics rack, on shelf 5-216, check continuity between pin 13 of rack connector R137-B and aircraft ground.

- NOT OK → Replace PA amplifier [1].
- OK → In zone 123, in relay box 19-123 (19-123, 20-123, 20-123) check 28VDC between pins A3 and B3 of test connectors UT1867 (1869, 1868, 1870) corresponding to relays [7] ([8], [9], [10]).
  - OK → Replace switch [11].
  - NOT OK → Replace relay [7] ([8], [9], [10]).

Chart 105

```
************************************
* PA AMPLIFIER OUTPUT AT MINIMUM   *
* LEVEL, DEPENDANT ON WHETHER      *
* ENGINES 'OFF' OR 'ON'.  AT MACH 1*
* SYSTEM IS SATISFACTORY.          *
************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

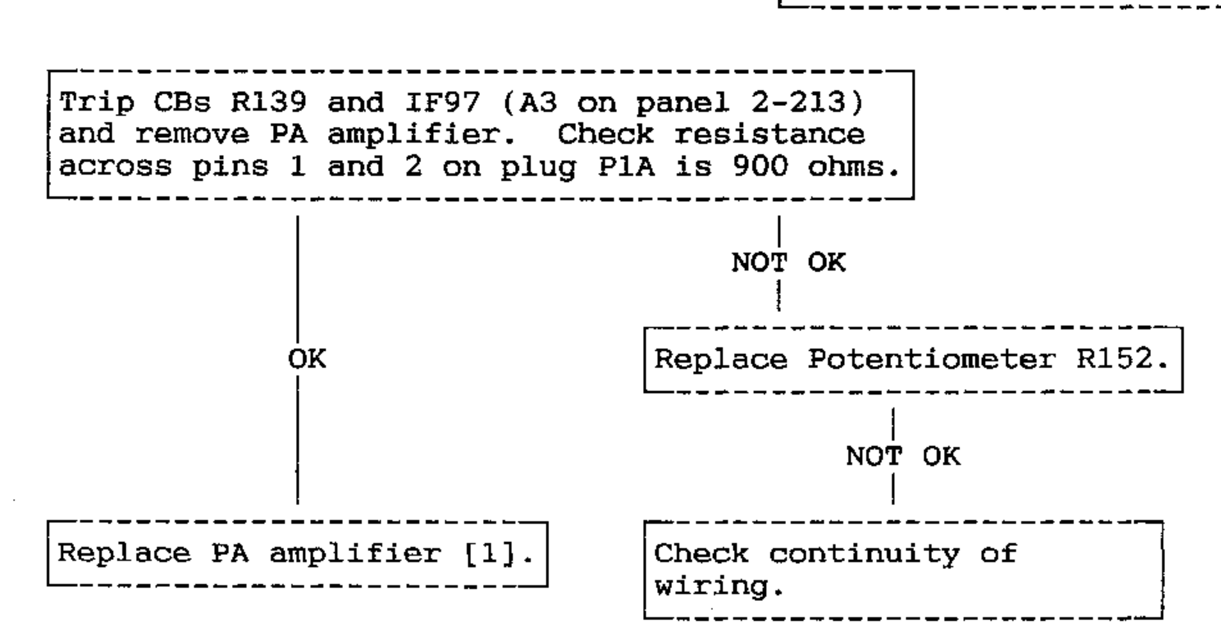


Chart 105A

```
***********************************
* PA AMPLIFIER OUTPUT AT MAXIMUM  *
* AT ALL TIMES.                   *
***********************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

Trip CBs R139 and IF97 (A3 on panel 2-213) and remove PA amplifier. Check resistance across pins 1 and 2 on plug P1A is 900 ohms.

OK: Locate and rectify short circuit in external gain potentiometer wing. Ref. WDM 23-31-11

NOT OK: Replace potentiometer R152.

Chart 105B

```
************************************
* PA AMPLIFIER OUTPUT AT HIGH      *
* LEVEL AT ALL TIMES.  6dBs DOWN   *
* WHEN ENGINES ARE OFF.            *
************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

On panel 5-216, with relay de-energized, check relay R9051 [31] contacts are closed.

NOT OK — Replace relay R9051 [31].

OK

Check power supply to ADC amplifier.

NOT OK — Check continuity of wiring.

OK

Replace the ADC amplifier.

NOTE: It is acceptable to remove the 1.0 amp fuse (R9054) and set the external gain potentiometer to 800 ohms, until full rectification of the defect is made.

Chart 105C

```
************************************
* POSSIBLE DAMAGE AND LOSS OF      *
* KEYLINE FACILITY TO PASSENGER    *
* ENTERTAINMENT AMPLIFIER          *
************************************
```

GROUND EQUIPMENT REQUIRED

DESCRIPTION	PART NO.
MULTIMETER	-

On shelf 5-216.
Check diode (R9056) for short circuit. —NOT OK— Replace diode (R9056).

Chart 105D

****
* LOSS OF MUTING FACILITY POST MOD *
* 23F141. *
****

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

With relay (R9050) [30] energised check contacts for continuity. — NOT OK — Replace relay R9050 [30].

OK

Check operation of relay coil R9050 [30]. — NOT OK — Check supply to relay coil R9050 [30].

OK

Check 2.0 Amp fuse R9055 [33]. — NOT OK — Replace 2.0 Amp fuse R9055 [33].

Chart 105E

****
* STEWARDS' SPEAKERS CONTINUOUSLY *
* MUTED. *
****

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

Check operation of relay R9050 [30]. — NOT OK — Replace relay R9050 [30].

Chart 105F

```
************************************
* PA AMPLIFIER OUTPUT DOES NOT     *
* INCREASE AUTOMATICALLY ABOVE     *
* MACH 1.                          *
************************************
```

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

Check	Result	Action
On shelf 5-216, check 100 ohm resistor (R9053).	NOT OK	Replace 100 ohm resistor (R90563).
OK — Check continuity of wiring.	NOT OK	Repair wiring as necessary.
OK — Check operation of relay R9051 [31].	NOT OK	Replace relay R9051 [31].
OK — Check fuse R9054 [32].	NOT OK	Replace fuse R9054 [32].
OK — Check diode R9057 for open circuit.	NOT OK	Replace diode R9057.
OK — Check continuity of wiring between relay R9051 splice and ADC amplifier.	NOT OK	Repair wiring as necessary.
OK — Check continuity of wiring between TCAS processor pin 5 and the ADC amplifier pin G.	NOT OK	Repair wiring as necessary.

Chart 105G

* NEITHER HI NOR LO TONE IS HEARD AT LOUDSPEAKERS.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	-

* Simulate a passenger call by pressing call switch at one of passenger amenity panels located in passenger compartment.

NOT OK → Check 28VDC supply at circuit breaker [27].

- NOT OK → Replace circuit breaker [27].
- OK → Replace PA amplifier [1].

OK → Replace PA amplifier [1].

- NOT OK → Check 28VDC supply at call switch [12].
  - NOT OK → Replace call switch [12].

Chart 106

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```
***************************************
* THE CHIME HI TONE IS NOT HEARD AT   *
* LOUDSPEAKERS.                       *
***************************************

*******************************************************
* Repeat the same operations from other passenger     *
* amenity panel.                                      *
*******************************************************
                |             |
                |             |         --------------------------------
            NOT OK            OK------| Replace faulty Steward call |
                |                      | switch.                      |
                |                      --------------------------------
                |
----------------------------------
| Replace PA amplifier [1].       |
----------------------------------
```

Chart 107

```
*************************************-----------------------------
* LO TONE IS NOT HEARD AT THE LOUD-  *| GROUND EQUIPMENT REQUIRED |
* SPEAKERS.                          *|---------------------------|
**************************************| DESCRIPTION       PART NO.|
                                      |---------------------------|
                                      | MULTIMETER                |
                                      -----------------------------

*****************************************************
* FASTEN SEAT BELTS signs are illuminated when      *
* FASTEN SEAT BELTS switch is in ON position and    *
* extinguished when switch is in OFF position.      *
*****************************************************
            |            |
            |            |            ------------------------------
         NOT OK          OK------| Replace PA amplifier [1].   |
            |                         ------------------------------
            |
-----------------------------------
| Check 28VDC supply at circuit   |
| breaker [28].                   |
-----------------------------------
            |            |
            |            |            ------------------------------
         NOT OK          OK------| Check 28VDC supply at switch|
            |                    | [13].                       |
            |                         ------------------------------
            |                                      |
----------------------------------                 |
| Replace circuit breaker [28]. |               NOT OK
----------------------------------                 |
                                                   |
                                      ------------------------------
                                      | Replace switch [13].       |
                                      ------------------------------
```

Chart 108

```
**************************************-------------------------------
* LO TONE IS NOT HEARD AT THE LOUD-  *| GROUND EQUIPMENT REQUIRED    |
* SPEAKERS.                          *|------------------------------|
**************************************| DESCRIPTION        PART NO.  |
                                      |------------------------------|
                                      | MULTIMETER                   |
                                      --------------------------------

*******************************************************
* NO SMOKING signs are illuminated when NO SMKG       *
* switch is in ON position and extinguished when the  *
* switch is in OFF position.                          *
*******************************************************
              |            |
              |            |            --------------------------------
           NOT OK          OK------| Replace PA amplifier [1].    |
              |                         --------------------------------
              |
----------------------------------
| Check 28VDC supply at circuit  |
| breaker [29].                  |
----------------------------------
              |            |
              |            |            --------------------------------
           NOT OK          OK------| Check 28VDC supply at switch|
              |                         | [14].                        |
              |                         --------------------------------
              |                                        |
---------------------------------                      |
| Replace circuit breaker [29]. |                   NOT OK
---------------------------------                      |
                                                       |
                                        --------------------------------
                                        | Replace switch [14].         |
                                        --------------------------------
```

Chart 109

```
**************************************-------------------------------
* AUDIO LEVEL UNCHANGED WHEN ACTING  *| GROUND EQUIPMENT REQUIRED   |
* ON POTENTIOMETER [15] OR [16].     *|-----------------------------|
**************************************| DESCRIPTION       PART NO.  |
                                      |-----------------------------|
                                      | MULTIMETER                  |
                                      |-----------------------------|

*******************************************************
* Check operation of slider and resistor of potentio-*
* meter [15] and/or [16]. The total resistance of    *
* each potentiometer is 2200 ohms                    *
*******************************************************
             |            |
             |            |     -------------------------------
          NOT OK          OK------| Replace PA amplifier [1].   |
             |                  -------------------------------
             |
----------------------------------
| Replace faulty potentiometer   |
| [15] and/or [16].              |
----------------------------------
```

Chart 110

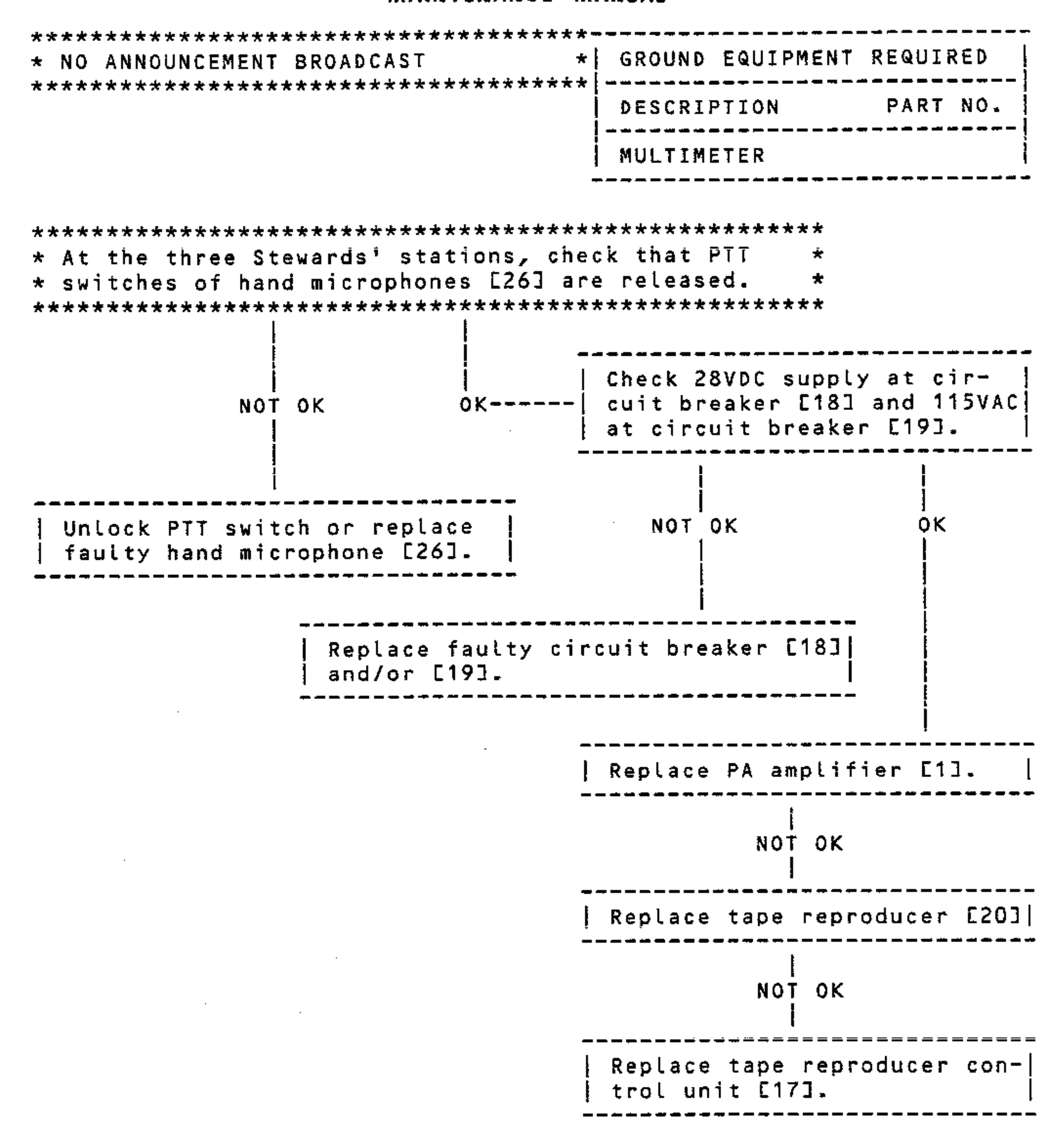

* NO ANNOUNCEMENT BROADCAST *
GROUND EQUIPMENT REQUIRED
DESCRIPTION
PART NO.
MULTIMETER
* At the three Stewards' stations, check that PTT switches of hand microphones [26] are released. *
NOT OK
OK
Check 28VDC supply at circuit breaker [18] and 115VAC at circuit breaker [19].
Unlock PTT switch or replace faulty hand microphone [26].
NOT OK
OK
Replace faulty circuit breaker [18] and/or [19].
Replace PA amplifier [1].
NOT OK
Replace tape reproducer [20]
NOT OK
Replace tape reproducer control unit [17].

Chart 111

```
**************************************
* ONLY A FEW ANNOUNCEMENTS ARE NOT   *
* BROADCAST. CANCEL FUNCTION INOPE-  *
* RATIVE.                            *
**************************************

******************************************************
* Replace tape reproducer [20].                      *
******************************************************
                          |
                          |
                        NOT OK
                          |
                          |
******************************************************
* Replace tape reproducer control unit [17].         *
******************************************************
```

Chart 112

```
*************************************-------------------------------
* THE EMERGENCY ANNOUNCEMENT IS NOT  *| GROUND EQUIPMENT REQUIRED   |
* BROADCAST.                         *|-----------------------------|
*************************************| DESCRIPTION      PART NO.   |
                                      |-----------------------------|
                                      | MULTIMETER                  |
                                      -------------------------------

*******************************************************
* Replace tape reproducer [20].                        *
*******************************************************
          |
      NOT OK
          |
-------------------------------          ---------------------------
| Check 28VDC supply at circuit|-NOT OK-| Replace circuit breaker  |
| breaker [22].                |        | [22].                    |
-------------------------------          ---------------------------
          |
          OK
          |                              ---------------------------
-------------------------------          | Check circuit between    |
| Check 28VDC between terminal |         | terminal X1 of relay     |
| X1 of relay [23] and aircraft|-NOT OK-| [23] and circuit breaker |
| ground.                      |        | [22]. Ref. WDM 35-21-01  |
-------------------------------          | and 35-21-11             |
          |                              ---------------------------
          OK
          |
-------------------------------          ---------------------------
| Check 28VDC between terminal |        | Place switch [21] in OFF |
| X2 of relay [23] and aircraft|-NOT OK-| position and check 28VDC |
| ground.                      |        | again.                   |
-------------------------------          ---------------------------
          |                                        |
      NOT OK                                   NOT OK
          |                                        |
-------------------------------          ---------------------------
| Replace switch [21].         |-NOT OK-| Replace relay [23].      |
-------------------------------          ---------------------------
```

Chart 113

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```
**************************************
* THE EMERGENCY ANNOUNCEMENT IS NOT  *
* BROADCAST. CANCEL FUNCTION INOPE-  *
* RATIVE.                            *
**************************************

******************************************************
* Replace tape reproducer [20].                      *
******************************************************
                          |
                          |
                       NOT OK
                          |
                          |
******************************************************
* Replace tape reproducer control unit [17].         *
******************************************************
```

Chart 114

```
************************************
* MUSIC IS NOT BROADCAST. MUSIC AUDIO*
* LEVEL UNCHANGED WHEN ACTING ON     *
* VOLUME BUTTON.                     *
************************************

****************************************************
* Replace tape reproducer [20].                    *
****************************************************
                          |
                          |
                       NOT OK
                          |
                          |
----------------------------------------------------
| Replace tape reproducer control unit [17].       |
----------------------------------------------------
```

Chart 115

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[1] Public Address Amplifier	216ES	5-216	R137	RH electronics rack	23-31-33 R/I	23-31-01 23-31-11
[2] Circuit Breaker, 28VDC		1-213	R139	Map Ref. K 20	24-50-00 R/I	23-31-01 23-31-11
[3] Captain's Audio selector Panel		7-211	R 53	Flight Compartment	23-41-21 R/I	23-51-01 23-31-11
[4] First Officer's audio Selector Panel		7-211	R 54	Flight Compartment	23-41-21 R/I	23-51-01 23-31-11
[5] Flight Engineer's audio Selector Panel		8-214	R 56	Flight Compartment	23-41-21 R/I	23-51-01 23-31-11
[6] 1st Supernumerary's audio selector panel		7-213	R 55	Flight Compartment	23-41-21 R/I	23-51-01 23-31-11
[7] HP Valve Relay, ENG1	123BB	19-123	1K133	Relay box, LH engines	73-13-00 R/I	73-21-11 23-31-11
[8] HP Valve Relay, ENG 2	123BB	19-123	2K133	Relay box, LH engines	73-13-00 R/I	73-21-12 23-31-11
[9] HP Valve Relay, ENG3	123BB	20-123	3K133	Relay box, RH engines	73-13-00 R/I	73-21-13 23-31-11
[10] HP Valve Relay, ENG4	123BB	20-123	4K133	Relay box, RH engines	73-13-00 R/I	73-21-14 23-31-11
[11] HP Valve Control Switch		4-211	1K132 to 4K132	Overhead Panel	73-20-00 R/I	73-21-11 to 73-21-14
[12] STEWARD CALL Indicator Light/Switch		4-211	M 79	Overhead Panel	33-00-00 R/I	23-31-11 33-27-11

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ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[13] FASTEN SEAT BELTS switch		4-211	W193	Overhead Panel	33-25-00 R/I	33-25-11 23-31-01
[14] NO SMKG switch		4-211	W194	Ovehead Panel	33-25-00 R/I	33-25-11 23-31-01
[15] Volume Potentiometer	216AS 216BS	11-216	R152	RH electronics rack	23-00-00 R/I	23-31-01 23-31-11
[16] Sensitivity Potentiometer	216AS 216BS	11-216	R153	RH electronics rack	23-00-00 R/I	23-31-01 23-31-11
[17] Tape Reproducer control unit		221	R246	Fwd Steward's station	23-31-34 R/I	23-31-05 23-31-51
[18] Circuit Breaker 28VDC		1-213	R248	Map Ref L 19	24-50-00 R/I	23-31-05 23-31-51
[19] Circuit Breaker 115VAC		2-213	R247	Map Ref G 21	24-50-00 R/I	23-31-05 23-31-51
[20] Tape Reproducer		221	R245	Fwd Steward's station	23-31-34 R/I	23-31-05 23-31-51
[21] PASSENGER SYSTEM EMERG MANUAL O/RIDE SWITCH		7-214	H1238	Flight Engineer's Panel	35-21-00 R/I	35-21-01
[22] Circuit Breaker, 28VDC		1-213	H1231	Map Ref C 11	24-50-00 R/I	35-21-01
[23] Relay Emergency oxy serv.		1-221	H1240	Fwd Steward's station	35-21-00 R/I	35-21-01

ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[24] Loudspeaker transformers		221 to 224 231 to 234 241 and 242		Pass. Compt Toilets and Stewards' stations	23-31-32 R/I	23-31-01 23-31-12 to 23-31-17
[25] Loudspeakers		221 to 224 231 to 234 241 and 242		Pass. Compt toilets and Stewards' stations	23-31-32 R/I	23-31-01 23-31-12 to 23-31-17
[26] Hand microphones		2-221 1-223 1-241	R146 R151 R158	All three Stewards' Stations		23-31-01 23-31-11 23-31-12 23-31-17
[27] Circuit Breaker, 28VDC		15-216	M 78	Map Ref. A 22	24-50-00 R/I	23-31-01 33-27-11
[28] Circuit Breaker, 28VDC		1-213	W191	Map Ref. L 8	24-50-00 R/I	23-31-01 33-25-11
[29] Circuit Breaker, 28VDC		1-213	W192	Map Ref. L 9	24-50-00 R/I	23-31-01 33-25-11
RB RB RB [30] Relay		5-216	R9050	RH Electronic Rack	23-31-00	23-31-12
RB RB RB [31] Relay		5-216	R9051	RH Electronic Rack	23-31-00	23-11-11
RB RB RB [32] Fuse		5-216	R9054	RH Electronic Rack	23-31-00	23-31-11

	ITEM NO. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
RB RB RB	[33] Fuse		5-216	R9055	RH Electronic Rack	23-31-00	23-31-12

Component Identification
Table 101

PUBLIC ADDRESS - MAINTENANCE PRACTICES

1. General

The output level of the Public Address amplifier is to be set up as follows:

A. Plug a multimeter set to ohms range between pins 1 and 2 of connector R137-A and adjust external output control R152 (11-216) to 900 ohms.

B. The external sensitivity control R153 (11-216) to be set fully clockwise.

PUBLIC ADDRESS - ADJUSTMENT/TEST

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	A/C Equipment
1 Hand Microphone	A/C Equipment
1 Circuit Breaker Safety Clip	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) On Captain's control column handwheel, plate RAD-INT PTT switch in intermediate position.

(4) On Captain's audio selector panel, make certain that :
- All keys on control keyboard are disengaged,
- All reception push-buttons are engaged,
- INT-RADIO PTT switch is in intermediate position,
- VOICE ONLY push-button is disengaged.

(5) On Captain's jack panel :
- Connect a boomset to BOOM jack,
- Place MIC SELECT OXY-BOOM switch in BOOM position.

(6) At forward Steward's station (in zone 221), on panel 2-221, make certain that hand microphone (aircraft equipment) is in place.

(7) On overhead panel (4-211), make certain that:
- FASTEN SEAT BELTS switch is placed in OFF position,
- NO SMKG switch is placed in OFF position,
- STEWARD CALL indicator light/switch is disengaged.

(8) On Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is placed in OFF position.

(9) At forward Steward's station (zone 221)

(a) On panel 1-221, make certain that TAPE REPRODUCER switch is in OFF position.

(b) Make certain that the pre-recorded announcement and music magazines are in place in the tape reproducer.

(10) Make certain that the following circuit breakers are set:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY IND	1-213	H1231	C11
No.1 INPH SUP		R 89	K19
PA SUP		R 139	K20
FASTEN S/BLTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
TAPE REPRO DC SUP		R 248	L19
1ST PILT AUDIO SELECTOR SUP		R 241	L21
TAPE REPRO AC SUP	2-213	R 247	G21
No.2 INPH SUP	3-213	R 90	H 2
PASS CALL SUP	15-216	M 78	A22

(11) Trip, safety and tag circuit breaker H1232 on panel 1-213, map ref. C10.

C. Tests

(1) Announcement made by the crew

(a) On Captain's audio selector panel :
- Engage PA key on control keyboard,
- disengage PA reception push-button.

(b) Place and hold RAD-INT PTT switch on Captain's control column handwheel in RAD position. Speak into boomset microphone to check passenger compartment, toilets and Steward's stations loudspeakers for correct operation.

(c) Release RAD-INT PTT switch on Captain's control column handwheel.

(2) Announcements made by the Stewards

(a) At forward Steward's station (in zone 221), speak into hand microphone while holding PTT switch pressed. Make certain that :
- Passenger compartment and toilets loudspeakers operate correctly,
- Steward's stations loudspeakers do not operate (zone 223 and 241).

(3) Captain-to-Steward call

(a) On overhead panel 4-211, press STEWARD CALL indicator light/switch and make certain that :
- At the three Stewards' stations, the chime HI-LO tone is heard in the loudspeakers and the pink FLIGHT DECK CALL indicator lights/switches illuminate
- No call tone is heard in passenger compartment and toilets loudspeakers.

(b) At one Steward's station, press FLIGHT DECK CALL indicator light/switch and make certain that :
- pink FLIGHT DECK CALL indicator lights/switches extinuish at the three Stewards' stations.

(4) Passenger-to-Steward call

(a) On one of the passenger amenity panels in zone 221, press STEWARD CALL indicator light/switch:
- STEWARD CALL indicator light/switch illuminates,
- At the three Stewards' stations, the chime HI tone is heard in loudspeakers and the Blue CABIN CALL caption light illuminates,
- Above the centre aisle in zones 221 and 231, the passenger call overhead indicator lights illuminate.

(b) Press again previously engaged call indicator light/switch :
- STEWARD CALL indicator light/switch extinguishes,
- Blue CABIN CALL caption light at each Steward's station and the passenger call overhead indicator lights extinguish.

(5) Instructions to passengers

(a) On overhead panel 4-211, place FASTEN SEAT BELTS switch in ON position :
- FASTEN SEAT BELTS signs illuminate in passenger compartment and at Stewards' panels,
- RETURN TO CABIN signs illuminate in the toilets,
- The chime LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers.

(b) On overhead panel 4-211, place FASTEN SEAT BELTS switch in OFF position :
- The chime LO tone is heard again in passenger compartment, toilets and Stewards' stations loudspeakers,
- FASTEN SEAT BELTS and RETURN TO CABIN signs mentioned in (5) (a) extinguish.

(c) On panel 4-211, place NO SMKG switch in ON position :
- The chime LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers,
- NO SMOKING signs illuminate in passenger compartment and at Stewards panels.

(d) On panel 4-211, place NO SMKG switch in OFF position :
- The chime LO tone is heard again in passenger compartment, toilets and Stewards' stations loudspeakers,
- NO SMOKING signs mentioned in (5) (c) extinguish.

(6) Broadcasting of pre-recorded announcements

NOTE : When the announcement is finished the magnetic tape rewinds to the initial position. When it is re-positioned, the corresponding status light located on tape reproducer control unit extinguishes. The status light remaining illuminated may indicate either one of the three following possibilities :
- the tape is rewinding
- no announcement has been recorded in the tape section concerned,
- the magazine is not fitted in the tape recorder.

(a) On tape reproducer control unit located at

forward Steward's station (in zone 221) :
- Press magazine selection push-button A,
- press one of the track selection push-buttons numbered from 2 to 8,
- make certain that the status light located on the LH side of magazine selection push-button is extinguished.

(b) On tape reproducer control unit, press ANN push-button and make certain that :
- Magazine selection push-button A illuminates,
- Track selection push-button illuminates,
- The status light associated with magazine A illuminates,
- The selected announcement is transmitted in passenger compartment and toilets loudspeakers.

(c) At the end of the announcement :
- The tape rewinds to its initial position,
- The status light associated with magazine A extinguishes.

(7) Emergency announcement control

(a) On panel 1-213, make certain that circuit breaker H1232 (map ref. 10) is tripped, safetied and tagged.

(b) On tape reproducer control unit (at Steward's station in zone 221) :
- Press magazine selection push-button B or C,
- The status light associated with the selected magazine must be extinguished,
- Press track selection push-button,
- Press ANN push-button :
  - the corresponding status light illuminates,
  - the selected announcement is broadcast in passenger compartment and toilets loudspeakers.

(c) On Flight Engineer's panel 7-214, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in ON position:
- make certain that the emergency announcement is broadcast in toilets loudspeakers interrupting the announcement previously selected (The emergency announcement having a top priority).

(d) On Flight Engineer's panel, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position.

(8) Broadcasting of music to passengers

(a) On tape reproducer control unit located at forward Steward's station (in zone 221), press CANCEL push-button.

(b) At forward Steward's station (in zone 221), on panel 1-221 :
- Place TAPE REPRODUCER switch in ON position,
- Turn VOLUME potentiometer clockwise.

(c) At forward Steward's station (in zone 221), on tape reproducer front panel, place BGM selector switch in position 1, 2, 3 or 4 :
- Make certain that selected music is broadcast in passenger compartment and toilets loudspeakers.

(d) At forward Steward's station (in zone 221), place TAPE REPRODUCER switch in OFF position :
- Music is no longer broadcast.

D. Close-Up

(1) On Captain's jack panel, disconnect boomset.

(2) On Captain's audio selector panel :
- Disengage PA key on control keyboard,
- engage PA reception push-button and turn integral potentiometer fully counterclockwise.

(3) On panel 1-213, remove safety clip and tag and reset circuit breaker H1232 (map ref C10).

(4) Stop electronics rack ventilation (Ref. 21-21-00).

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Pneumatic Headphone	Line Equipment
4 Boomsets	A/C Equipment
3 Hand Microphones	A/C Equipment
Circuit Breaker Safety Clips	

B. Prepare

(1) Connect electrical ground power unit, and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) Remove access panels 215ES and 216ES.

(4) On Captain's and First Officer's control column handwheels place RAD-INT PTT switches in intermediate position.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :
- All keys on control keyboard are disengaged
- All reception push-buttons are engaged
- The INT-RADIO PTT switch is in intermediate position
- The VOICE ONLY push-button is disengaged.

(6) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's jack panels :
- Connect a boomset to BOOM jack
- Place MIC SELECT OXY-BOOM switch in BOOM position.

(7) At each Steward's station (Zones 221, 223, 241), make certain that the aircraft hand microphones are in place.

(8) On overhead panel 4-211, make certain that :
- FASTEN SEAT BELTS switch is placed in OFF position

- NO SMKG switch is placed in OFF position
- STEWARD CALL indicator light/switch is disengaged.

(9) On Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is placed in OFF position.

(10) At forward Steward's station (in zone 221), on panel 1-221, make certain that :
- TAPE REPRODUCER switch is in OFF position,
- PASS STEREO switch is in OFF position.

(11) At forward Steward's station (in zone 221), make certain that announcement and music magazines are in place in address (PA) tape reproducer.

(12) On shelf 5-215, make certain that magazines are in place in passenger entertainment (PE) tape reproducer.

(13) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG2 HP VALVE CONT	1-213	2K 131	C 3
ENG3 HP VALVE CONT		3K 131	C 4
EMER PASS OXY IND		H1231	C11
No.1 INPH SUP		R 89	K19
PA SUP		R 139	K20
FASTEN S/BLTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
TAPE REPRO DC SUP		R 248	L19
3 CM AUDIO SELECTOR SUP		R 243	L20
1ST PILT AUDIO SELECTOR SUP		R 241	L21
TAPE REPRO AC SUP	2-213	R 247	G21
ENG1 HP VALVE CONT	3-213	1K 131	C 1
ENG4 HP VALVE CONT		4K 131	C 2
No.2 INPH SUP		R 90	H 2
2ND PILT AUDIO SELECTOR SUP		R 242	H 3
1ST SUPERNY AUDIO SELECTOR SUP		R 244	H 4
PASS ENT AC SUP	14-215	R 333	B 4
PASS ENT DC SUP	15-215	R 332	G18
PASS CALL SUP	15-216	M 78	A22

(14) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY CONT	1-213	H1232	C10
No.1 T1 PROBE HTR SUP	13-215	1H 542	C 9
No.2 T1 PROBE HTR SUP	14-215	2H 542	E 8
No.3 T1 PROBE HTR SUP	14-216	3H 542	C14
No.4 T1 PROBE HTR SUP	13-216	4H 542	C11

(15) In passenger, compartment connect a pneumatic headphone to passenger entertainment control box at one passenger seat and select one channel.

C. Tests

(1) Amplifier

(a) In RH electronics rack, on shelf 5-216, place and hold CALIBR-NORMAL-TEST selector switch, on front panel of amplifier, in CALIBR position.
- Check that VU-meter pointer reads 0 dB.

(b) On amplifier, place and hold selector switch in TEST position :
- Make certain that passenger compartment, toilets and Steward's stations loudspeakers are in correct operating condition (Signal frequency = 587 Hz).

(c) On amplifier, place selector switch in NORMAL position.

(2) Announcements made by the crew

(a) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels,

- Engage PA key on control keyboard,
- Disengage PA reception push-button, and then place the integral potentiometer in an intermediate position.

(b) At forward Steward's station (in zone 221) on panel 1-221 :
- Place PASS STEREO switch in ON position,
- check passenger entertainment reception at passenger seat pneumatic headphone.

(c) Place and hold RAD-INT PTT switch, on Captain's control column handwheel, in RAD position. Speak into boomset microphone, and make certain that :
- Passenger compartment, toilets and Stewards' stations loudspeakers are in correct operating condition,
- Reception in boomsets at First Officer's, Flight Engineer's and First Supernumerary's jack panels is correct,
- The potentiometers integral with the PA reception push-buttons, on the audio selector panels, are in correct operating condition,
- The announcement replaces selected music program at pneumatic headphone.

(d) Release RAD-INT PTT switch on Captain's control column handwheel.

(e) Place and hold RAD-INT PTT switch, on First Officer's control column handwheel, in the RAD position, speak into boomset microphone, and make certain that :
- Passenger compartment, toilets and Stewards' stations loudspeakers are in correct operating condition,
- Reception in boomsets at Captain's, flight Engineer's and First Supernumerary's jack panels is correct,
- The potentiometers integral with the PA reception push-button, on Captain's audio selector panel, is in correct operating condition,
- Reception in passenger entertainment pneumatic headphone is correct.

(f) Release RAD-INT PTT switch on First Officer's control column handwheel.

(g) Place and hold INT-RADIO PTT switch, on Flight Engineer's audio selector panel, in RADIO position. Speak into boomset microphone, and make certain that :
- Passenger compartment, toilets and Stewards' stations loudspeakers are in correct operating condition,
- Reception in boomsets at Captain's, First Offi-

cer's and First Supernumerary's jack panels is correct,
- Reception in passenger entertainment pneumatic headphone is correct.

(h) Release INT-RADIO PTT switch on Flight Engineer's audio selector panel.

(i) Place and hold INT-RADIO PTT switch, on First Supernumerary's audio selector panel, in RADIO position. Speak into boomset microphone, and make certain that :
- Passenger compartment, toilets and Stewards' stations loudspeakers are in correct operating condition,
- Reception in boomsets at Captain's, First Officer's and Flight Engineer's jack panels is correct,
- Reception in passenger entertainment pneumatic headphone is correct.

(j) Release INT-RADIO PTT switch on First Supernumerary's audio selector panel.

(3) Announcements made by Stewards

(a) At Stewards' station in zone 221, press the hand microphone PTT switch, speak into the micrphone, and make certain that :
- Passenger compartment and toilets loudspeakers are in correct operating condition,
- The loudspeakers at Stewards' stations in zones 223 and 241 are not energized.
- The announcement replaces the music program at the pneumatic headphone.

(b) At Steward's station in zone 223, press the hand microphone PTT switch, speak into the microphone and make certain that :
- Passenger compartment and toilets loudspeakers are in correct operating condition,
- The loudspeakers at Stewards' stations in zones 221 and 223 are not energized.
- The announcement replaces the music program at the pneumatic headphone.

(c) At Steward's station in zone 241, press the hand microphone PTT switch, speak into the microphone and make certain that :
- Passenger compartment and toilets loudspeakers are in correct operating condition,

- The loudspeakers at Stewards' stations in zones 221 and 223 are not energized.
- The announcement replaces the music program at the pneumatic headphone.

(4) Priority in Transmit Mode

(a) At a Steward's station, press the hand microphone PTT switch and speak into the microphone.

(b) At a crew member's audio selector panel, place and hold the INT-RADIO PTT switch in RADIO position, and speak into boomset microphone :
- Make certain that signals received in passenger compartment loudspeakers are those from the flight compartment and not those from the Steward's station.

(5) Attenuation

(a) At fuel panel 5-214, make certain that the 4 LP VALVE switches are in SHUT 1 position.

(b) On panel 4-211, make certain that HP VALVE 1, 2, 3, 4 switches are placed in the SHUT position and that the 4 engine shut down handles are pushed (normal position).

(c) At a steward's station, press the hand microphone PTT switch and speak into the microphone :
- Check that output level of loudspeakers in passenger compartment and toilets is correct.

(d) On panel 4-211, place HP VALVE 1 switch in OPEN position :
- Check that output level of loudspeakers in passenger compartment and toilets has increased.

(e) On panel 4-211, place HP VALVE 1 switch in SHUT position.
- Make certain that output level of loudspeakers in passenger compartment and toilets has decreased (audio signal identical with that in para. 1. C. (5) (c)).

(f) Repeat operations 1. C. (5) (c) to 1. C. (5) (e) using HP VALVE 2 - 3 - 4 switches. Results identical.

(6) Captain-to-Steward call

(a) On panel 4-211, press STEWARD CALL indicator light/switch and make certain that :
- At Stewards' stations, the chime HI-LO tone is heard in the loudspeakers
- At Stewards' stations, the pink FLIGHT DECK CALL indicator lights/switches illuminate
- No call tone is heard in passenger compartment and toilets loudspeakers.

NOTE : The two pink FD CALL indicator lights/ switches located in the aisle forward and aft of passenger compartment illuminate.

(b) At one of the Steward's stations, press pink FLIGHT DECK CALL indicator light/switch :

- The three FLIGHT DECK CALL indicator lights/ switches at all three Stewards' stations and the two FD CALL indicator lights/switches in the aisle extinguish.

(7) Passenger-to-Steward call

(a) On one of passenger amenity panels in zone 221, press STEWARD CALL indicator light/switch :
- The indicator light/switch illuminates
- At the three Stewards' stations, the Blue CABIN CALL caption lights illuminate
- Above the centre aisle, in zones 221 and 231, the passenger call overhead indicator lights illuminate
- At Stewards' stations in zones 221, 223 and 241 the chime HI tone is heard in the loudspeakers.
- No call tone is heard in passenger compartment and toilets loudspeakers.

(b) Press again previously engaged STEWARD CALL indicator light/switch on passenger amenity panel
- The indicator light/switch extinguishes
- At all Stewards' stations, the Blue CABIN CALL caption lights extinguish
- The passenger call overhead indicator lights in zones 221 and 231 extinguish.

(8) Instructions to passengers

(a) On panel 4-211, place FASTEN SEAT BELTS switch in ON position :
- FASTEN SEAT BELTS signs illuminate in passenger compartment and at Stewards' stations

- The chime LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers.
- RETURN TO CABIN signs illuminate in the toilets

(b) On panel 4-211, place the FASTEN SEAT BELTS switch in OFF position :
- The chime LO tone is heard again in passenger compartment, toilets and Stewards' stations loudspeakers
- FASTEN SEAT BELTS and RETURN TO CABIN signs extinguish.

(c) On panel 4-211, place NO SMKG switch in ON position :
- The chime LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers
- NO SMOKING signs illuminate in passenger compartment and at Stewards' stations.

(d) On panel 4-211, place NO SMKG switch in OFF position :
- The chime LO tone is heard again in passenger compartment, toilets and Stewards' stations loudspeakers
- No SMOKING signs extinguish.

(9) Broadcasting of pre-recorded announcements.

NOTE : When the announcement is finished, the magnetic tape rewinds to its initial position. When it is re-positioned, the corresponding status light on the tape reproducer control unit extinguishes. The status light remaining illuminated may indicate either one of the following possibilities :
- The tape is re-winding,
- No announcement has been recorded in the tape section concerned,
- The magazine is not fitted in the tape reproducer.

(a) At forward Steward's station (in zone 221), on the tape reproducer control unit :
- Press magazine selection push-button A
- Press one of track selection push-buttons numbered from 2 to 8
- Make certain that the status light, at the LH side of magazine selection push-button, is extinguished.

(b) On tape reproducer control unit, press ANN push-button and make certain that :
- Magazine selection push-button A illuminates
- Track selection push-button illuminates,
- Status light corresponding to magazine A illuminates,
- Broadcasting of announcement starts from the beginning of record,
- Announcement selected is correctly received in passenger compartment and toilets loudspeakers.
- The announcement replaces the music program at the pneumatic headphone.

(c) When the announcement is finished, the tape rewinds to its initial position.

(d) The status light associated with magazine A extinguishes.

(10) Announcement track selection control

(a) On tape reproducer control unit (Steward's station in zone 221) :
- Press magazine selection push-button B
- Press one track selection push-button

(b) On tape reproducer control unit, press ANN push-button :

- Refer to para. 1. C. (9) (b), results identical.

(c) On tape reproducer control unit, press CANCEL push-button :
- Announcement in progress is stopped.

(d) Repeat operation 1. C. (10) (a), selecting another track.

(e) On tape reproducer control unit, press ANN push-button and make certain that :
- Announcement broadcast in passenger compartment and toilets loudspeakers is different from that previously selected.

(11) Announcement pre-selection.

(a) On tape reproducer control unit (Steward's station in zone 221) :
- Press magazine selection push-button B
- Press one track selection push-button

(b) On tape reproducer control unit, press ANN push-button :

- Refer to para. 1. C. (9) (b), results identical.

(c) On tape reproducer control unit :
- Press magazine selection push-button C,
- Press one track selection push-button.

(d) As soon as announcement from magazine B is finished or interrupted, make certain that :
- Magazine C status light remains extinguished
- Magazine C status light illuminates and selected announcement is broadcast in passenger compartment and toilets loudspeakers when ANN push-button is pressed.

(12) Emergency announcement

(a) On panel 1-213, make certain that circuit breaker H1232 (map ref C10) is tripped.

(b) On tape reproducer control unit (Steward's station in zone 221) :

- Press magazine selection push-button B or C,
- Press one track selection push-button
- Press ANN push-button, and then check that announcement is broadcast in passenger compartment and toilets loudspeakers.

(c) On Flight Engineer's panel 7-214, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in ON position, and make certain that :
- Emergency announcement is broadcast in passenger compartment, toilets and Stewards' stations loudspeakers.
- Announcement previously selected in magazine B or C is no longer broadcast (emergency announcement having a top priority)
- Emergency announcement replaces music program at pneumatic headphone.

(d) On Flight Engineer's panel, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position.

(13) Broadcasting of music to passengers.

(a) At forward Steward's station (in zone 221), on tape reproducer control unit :
- Press CANCEL push-button.

(b) At forward Steward's station (in zone 221), on panel 1-221 :
- Place TAPE REPRODUCER switch in ON position
- Turn VOLUME potentiometer clockwise.

(c) At forward Steward's station, on forward amenity stowage, open access door to tape reproducer front panel :
- Place BGM 1-2-3-4-A selector switch in track 1 position and make certain that music is broadcast in passenger compartment and toilets loudspeakers.

(d) At forward Steward's station (in zone 221) on tape reproducer front panel :
- Place BGM 1-2-3-4-A selector switch in track 2, then in track 3, then in track 4 position and check that different music programs are broadcast in passenger compartment and toilets loudspeakers for each selected track.
- Place BGM 1-2-3-4-A selector switch in position A and check that music program is broadcast in passenger compartment and toilets loudspeakers.

(e) At forward Steward's station (in zone 221), on panel 1-221 :
- Place TAPE REPRODUCER switch in OFF position.

(14) Priority of Stewards' calls over announcements.

(a) At forward Steward's station (in zone 221) on tape reproducer control unit :
- Press magazine selection push-button A, B or C
- Press one track selection push-button
- Press ANN push-button, and then make certain that the announcement is broadcast in passenger compartment and toilets loudspeakers.

(b) At Stewards' stations (e.g. in zone 221), press PTT switch integral with hand microphone, speak into microphone, and make certain that :
- The Steward's voice is heard in the loudspeakers, replacing previously selected announcement.

(c) At forward Steward's station (in zone 221), on tape reproducer control unit, press CANCEL push-button.

(15) Priority of announcements over music

(a) At forward Stewards' station (in zone 221), on panel 1-221, place TAPE REPRODUCER switch in ON position.

(b) On tape reproducer front panel (Zone 221), select one music track and make certain that the record is broadcast in passenger compartment and toilets loudspeakers.

(c) On tape reproducer control unit (in zone 221):
- Press magazine selection push-button A, B or C
- Press one track selection push-button
- Press ANN push-button, and make certain that the announcement takes the place of previously selected music.

(d) On tape reproducer control unit (in zone 221), press CANCEL push-button. Music must be broadcast again in the loudspeakers.

(e) At forward Stewards' station (in zone 221), place TAPE REPRODUCER switch in OFF position.

RB (16) Automatic Volume Increase above Mach 1.

RB (a) Pull circuit breakers R139 (PA System) (on panel
RB 1-213) and IF97 (Captains' VSI) (location A3 on
RB panel 2-213) and remove the PA amplifier.

RB (b) Set the resistance of the External Gain
RB Potentiometer, measured across Pins 1 and 2 of
RB Plug PIA, to 900 ohms.

RB (c) Set the PA amplifier circuit breaker (R139), the
RB resistance between Pins 1 and 2 shall fall to
RB approximately 90 ohms.

RB (d) Set the VSI circuit breaker (1F97) and switch on
RB ADC No.1. The resistance between pins 1 and 2
RB should increase to 900 ohms.

RB (e) Carry out an ADC Self Test 2 (Ref. 34-11-00,
RB Adjustment/Test), the resistance between pins 1
RB and 2 should change from 900 ohms to 90 ohms
RB during the test.

RB (f) Pull the PA amplifier circuit breaker (R139) and
RB refit the PA amplifier. Reset the PA amplifier
RB circuit breaker.

RB (g) Measure the volume of speech on the PA System at
RB any speaker with a sound pressure meter (Part No.
RB 1565B or similar).

RB (h) Conduct ADC Self Test 2 (Ref. 34-11-00, Adjustment/Test) and check that the volume increases by at least 3dBs from the same speaker as the check in sub-para. (g) above.

D. Close-Up

(1) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's jack panels, disconnect boomsets.

(2) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels:
- Disengage PA key on control keyboard
- Press PA reception push-button and turn counter-clockwise integral potentiometer.

(3) At passenger seat, disconnect passenger entertainment pneumatic headphone.

(4) At forward Stewards' station (in zone 221), on panel 1-221:
- Place PASS STEREO switch in OFF position.

(5) Remove safety clips and tags and reset circuit breakers tripped in paragraph "2.B.(14).

(6) Install access panels 215ES and 216ES.

(7) Stop electronics racks ventilation (Ref. 21-21-00).

(8) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(9) In zone 221, on forward amenity stowage, close access door to tape reproducer.

3. System Test

Identical with Functional test. Refer to paragraph 2.

4. Performance Check - RASTI Method

A. Equipment and Materials

DESCRIPTION	PART NO.
Bruel & Kjaer RASTI Test Set comprising:	Type 3361L
Transmitter	Type 4225
Receiver	Type 4419
Sound Level Meter	Type 1565B or TC1565B or 2232

B. Description of RASTI Measurement

This RASTI method of performance checking the PA system provides a full assessment of the system in terms of intelligibility throughout the aircraft. The test set transmitter is used to feed a 'calibrated noise' signal of a predetermined level into the input of the PA system via one of the microphone inputs. The 'calibrated noise' signal is fed through the PA amplifiers and broadcast over the loudspeaker system throughout the aircraft.

The test set receiver, via its microphone, measures the received signal at pre-determined locations throughout the aircraft, analyses the resultant signal over a period of time and gives an output reading between 0 (zero) and 1 (one) (RASTI reading) to indicate the level of intelligibility. The minimum intelligibility (RASTI reading) being targeted for during ground checks is 0.7, this being indicative of good intelligibility.

However, during the certification process of the aircraft it was required that the aircraft be 'mapped' in terms of RASTI readings for each attendant and toilet location together with a number of specific (generally worst case) passenger seat locations. These results have established typical results for the aircraft and form a benchmark for future checks to establish any degradation in performance.

NOTE: The following checks must be carried out with the aircraft in a fully equipped and configured state i.e. all seats, galleys, partitions, furnishings, etc., installed and with minimal, external to aircraft, noise. Results will determine any maintenance action necessary.

C. Description of Tests

The two test procedures are described below. One offers a simple check for meeting AMS RASTI requirements and determining if there is any significant degradation in the performance of individual PA speakers. The second test offers the full RASTI procedure as required by Specification 15 for certification of the PA system.

D. Procedure 1 - Speaker Volume Check

(1) Set Captain's VSI circuit breaker (A3 on panel 2-213).

(2) Switch on ADC 1.

(3) Link up the RASTI transmitter to any of the crew jack panel microphone sockets and set a volume of 100 dBA as measured at the front steward's panel.

(4) Use the sound level meter and check that the volume at each of the speakers on the aircraft are within 2 dB of the values stated below.

	dBA
Front Steward	100
Mid Steward	102
Rear Steward	104
Rows 1 to 9	100
Row 10	102
Rows 11 to 14	100
Rows 15 to 19	102
Rows 20 to 26	104
Toilets	98

E. Procedure 2 - RASTI Intelligibility Measurement

(1) Set Captain's VSI circuit breaker (A3 on panel 2-213).

(2) Switch on ADC 1.

(3) At first cabin speaker check sound level while speaking into cockpit headset microphone. It should be approx. 95 dBA.

(4) Plug in RASTI transmitter equipment to the HAND MIC jack at Captain's console jack panel and select 'ON', 10 dB + REF and external speaker. Set output volume to 95 dBA through the external speaker adjustment on the front of the RASTI transmitter or the lead potentiometer box.

(5) Pull Captain's VSI circuit breaker and check that volume increases. Then reset the circuit breaker so that volume reverts back to 95 dBA.

(6) Conduct RASTI check.

(a) Set RASTI receiver controls as follows:

- Power - ON
- Measurement period - 8 s (pushbutton 0)
- Calculation - RASTI (pushbutton 7).

(b) At each designated measurement location, hold test set microphone at normal head height position, depress 'Single' measurement pushbutton, wait for 8 s (maintaining silence) and read/record RASTI value shown in display. Repeat only as necessary to achieve consistent reading.

(c) RASTI values measured in (b) above should be compared with the quoted figures in Table 1 and no reading in the cabin shall in any case be less than a minimum of 0.7.

Significantly lower readings are indicative of a system degradation requiring troubleshooting and maintenance action in the applicable area.

(d) Switch OFF and disconnect RASTI test set.

(7) Flight Noise Simulation RASTI Check

One of the factors affecting speech intelligibility is the local background noise at the listener's position. This background noise may not always be present when the speech intelligibility tests are being made, and in these applications the RASTI receiver's internal noise floor facility can be used to simulate the effect of the local background noise.

This is done by entering an additional noise floor in each of the octave bands. The additional noise floor is added to the measured signal in the RASTI receiver and results in a reduction in the signal modulation.

(a) Ensuring fuel release precautions first, set HP cock to simulate engines running PA volume. Then pull Captain's VSI circuit breaker and conduct RASTI check with simulated noise values as shown in Table 1.

(b) The procedure for entering the noise floor is as follows:

- Select the octave band in which the noise floor is to be entered by pressing the '500 Hz' or '2 kHz' pushkey.
- Press and hold the 'Stop/2nd' pushkey.
- Press the 'Level' pushkey momentarily.
- Enter the required noise floor in dB to one decimal place using the numbered pushkeys. The decimal point is automatically entered.
- Release the 'Stop/2nd' pushkey.
- Repeat the procedure to enter a noise floor for any other required octave band.

NOTE: The noise floor entered in each band may be viewed by selecting the octave band of interest, then, while holding 'Stop/2nd' pushkey depressed, press 'Level' pushkey momentarily. When the instrument is first switched on a value of -00 dB is assumed for the additional noise floor in each band (displayed and entered as 0.0).

RASTI CHECKS

A/C Type CONCORDE

RESULTS SHEET

Reg'n G-BOAG
Date Checked
O/P Level (dBA) 95

Location	Ground Typical Values	Ground Readings	Simulated Cruise Readings at:	noise floor
AS1 (LH Steward)	0.70			2 kHz-73 dBA
AS2 (RH Steward)	0.93			and
AS3 (RH mid Steward)	0.90			500 Hz-88 dBA
AS4 (LH mid Steward)	0.95			"
AS5 (LH rear Steward)	0.81			"
AS6 (RH rear Steward)	0.70			"
AW1 (RH Front Galley)	0.80			"
AW2 (LH Front Galley)	0.76			"
AW3 (RH Rear Galley)	0.70			"
AW4 (Front Galley)	0.78			"
T1 (Front Toilet)	0.89			2 kHz-69 dBA
T2 (LH mid Toilet)	0.81			and
T3 (RH mid Toilet)	0.88			500 Hz-84 dBA
P1 (Seat 1B)	0.78			"
P2 (Seat 4A)	0.96			"
P3 (Seat 7B)	0.70			"
P4 (Seat 10A)	0.95			"
P5 (Seat 12B)	0.93			"
P6 (Seat 16A)	0.94			"
P7 (Seat 19B)	0.94			2 kHz-73 dBA
P8 (Seat 22A)	0.96			and
P9 (Seat 24B)	0.97			500 Hz-88 dBA
P10 (Seat 26A)	0.93			"

Table 1

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	A/C Equipment
1 Hand Microphone	A/C Equipment
1 Circuit Breaker Safety Clip	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) On Captain's control column handwheel, place RAD-INT PTT switch in intermediate position.

(4) On Captain's audio selector panel, make certain that :
- All keys are disengaged on control keyboard
- All reception push-buttons are disengaged
- INT-R/T PTT switch is in intermediate position
- BOOM-MASK switch is in BOOM position
- VOICE push-button is disengaged

(5) On Captain's jack panel :
- Connect a boomset to HEADSET and MIC jack.

(6) At forward Steward's station (in zone 221), make certain that the hand microphone (aircraft equipment) is in place.

(7) On overhead panel 4-211, make certain that :
- FASTEN SEAT BELTS switch is in OFF position
- NO SMKG switch is in OFF position
- STEWARD CALL indicator light/switch is disengaged

(8) On Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

(9) At forward Steward's station (in zone 221), make certain that :

(a) VOLUME-OFF button on tape reproducer control unit is in OFF position

(b) Pre-recorded announcement and music magazines are in place in the tape reproducer

(10) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY CONT & IND	1-213	H1231	C11
No.1 INPH SUP		R 89	K19
PA SUP		R 139	K20
FASTENS/BELTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21
No.2 INPH SUP	3-213	R 90	H 2
PASS CALL SUP	15-216	M 78	A22

(11) Trip, safety and tag circuit breaker H1232 on panel 1-213 (map Ref. C10).

C. Tests

(1) Announcements made by the crew

(a) On Captain's audio selector panel :
- Engage PA key on control keyboard

(b) Place and hold RAD-INT PTT switch on Captain's control column handwheel in RAD position. Speak into boomset microphone to check passenger compartment, toilets and Steward's stations loudspeakers for correct operation.

(2) Announcements made by the Stewards

(a) At forward Steward's station (in zone 221), speak into hand microphone while holding PTT switch pressed. Check passenger compartment,

toilets and Steward's stations loudspeakers for correct operation.

(3) Captain-to-Steward Call

(a) On overhead panel 4-211, press STEWARD CALL indicator light/switch and make certain that :
- chime HI-LO tone is heard in passenger compartment, toilets and Steward's stations loudspeakers
- the pink FLIGHT DECK CALL caption lights illuminate at the three Steward's stations.

(b) At one of the Steward's stations, press FLIGHT DECK CANCEL push-button :
- the pink FLIGHT DECK CALL caption lights extinguish at the three Steward's stations.

(4) Passenger-to-Steward Call

(a) On one of the passenger amenity panels in zone 221, press Steward call indicator light/switch
- the Steward call indicator light/switch illuminates

B
- the Blue FWD CABIN caption lights illuminate at Steward's stations in zones 221 and 223
- above the centre aisle in zones 221 and 223, the passenger call overhead indicator lights illuminate.

(b) On the passenger amenity panel previously used, press again Steward call indicator light/switch
- Steward call indicator light/switch extinguishes
- the Blue FWD CABIN caption lights extinguish at Steward's stations in zones 221 and 223
- the passenger call overhead indicator lights extinguish in passenger compartment.

(5) Instructions to passengers

(a) On overhead panel 4-211, place FASTEN SEAT BELTS switch in ON position :
- FASTEN SEAT BELTS signs illuminate in passenger compartment and at Steward's panels
- RETURN TO CABIN signs illuminate in the toilets
- the chime LO tone is heard in passenger compartment, toilets and Steward's stations loudspeakers.

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(b) On overhead panel 4-211, place FASTEN SEAT BELTS switch in OFF position :
- the chime LO tone is heard again in passenger compartment, toilets and Steward's stations loudspeakers
- FASTEN SEAT BELTS and RETURN TO CABIN signs extinguish.

(c) On overhead panel 4-211, place NO SMKG switch in ON position :
- the chime LO tone is heard in passenger compartment, toilets and Steward's stations loudspeakers
- NO SMOKING signs illuminate in passenger compartment and on Steward's panels.

(d) On overhead panel 4-211, place NO SMKG switch in OFF position :
- the chime LO tone is heard again in passenger compartment, toilets and Steward's stations loudspeakers
- NO SMOKING signs extinguish.

(6) Broadcasting of music to passengers

(a) On tape reproducer control unit located at forward Steward's station in zone 221 :
- turn clockwise VOLUME button to intermediate position to obtain a normal audio level
- make certain that WAIT caption lights associated with announcement magazines are extinguished
- make certain that music program is broadcast in passenger compartment, toilets and Steward's stations loudspeakers.

(b) Turn VOLUME button clockwise then counterclockwise and check its action on the audio level. Return VOLUME button to intermediate position.

(7) Broadcasting of pre-recorded announcements

NOTE : When the announcement is finished, the magnetic tape rewinds to its initial position. When it is re-positioned, the WAIT caption light associated with the magazine extinguishes on tape reproducer control unit.
The WAIT caption light remains illuminated if the selected magazine is not ready to operate immediately, indicating either one of the following possibilities :

- the tape including the selected announcement is not in position
- no announcement has been recorded in the tape section concerned.

(a) On tape reproducer control unit located at forward Steward's station (in zone 221), make certain that :
- WAIT caption lights associated with the selected magazines are extinguished.

(b) On tape reproducer control unit, press one of the twelve announcement selection push-buttons (except push-button No.1)
- WAIT caption light associated with the selected magazine illuminates
- music is no longer broadcast in loudspeakers
- broadcasting of the announcement starts from the beginning of the record
- the selected announcement is received in passenger compartment, toilets and Steward's stations loudspeakers.

(c) The announcement finished,
- the tape rewinds to its initial position, the associated WAIT caption light extinguishes
- music is broadcast in loudspeakers.

(d) At forward Steward's station (in zone 221) on tape reproducer control unit turn VOLUME button counterclockwise to OFF position :
- music is no longer broadcast in passenger compartment, toilets and Steward's stations loudspeakers.

(8) Emergency announcement automatic control

(a) On panel 1-213, make certain that circuit breaker H1232 (map ref. C10) is tripped, safetied and tagged.

(b) On tape reproducer control unit, press one of the twelve announcement push-buttons (except push-button No.1) :
- WAIT caption light associated with selected magazine illuminates
- the selected announcement is broadcast in passenger compartment, toilets and Steward's stations loudspeakers.

(c) On Flight Engineer's panel 7-214, place PASSENGER

SYSTEM EMERG MANAUL O/RIDE switch in ON position and make certain that :
- on tape reproducer control unit, WAIT caption light associated with selected magazine (announcement 1 to 4) illuminates
- the emergency announcement is broadcast in passenger compartment, toilets and Stewards' stations loudspeakers
- the announcement previously selected is stopped (the emergency announcement having a top priority).

(d) During the time the announcement is broadcast, press CANCEL push-button on tape reproducer control unit. Make certain that :
- the emergency announcement is still broadcast.

(e) On Flight Engineer's panel, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position

D. Close-Up

(1) On Captain's jack panel, disconnect boomset from BOOM and HEADSET jack.

(2) On Captain's audio selector panel, disengage PA key on control keyboard.

(3) On panel 1-213, remove safety clip and tag and reset circuit breaker H1232 (map ref. C10).

(4) Stop electronics rack ventilation (Ref. 21-21-00).

(5) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 E-M Headsets	Airline Equipment
4 Boomsets	A/C Equipment
5 Circuit Breaker Safety Clips	
3 Hand Microphones	A/C Equipment

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (24-41-00, Servicing).

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) Remove access panels 215ES and 216ES.

(4) Place RAD-INT PTT switches in intermediate position on :
- Captain's and First Officer's control column handwheels
- First Supernumerary's panel 3-213
- Second Supernumerary's panel 20-215.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :
- All keys on control keyboard are disengaged.
- All reception push-buttons are disengaged.
- The INT-R/T PTT switch is in intermediate position.
- The BOOM-MASK switch is in BOOM position.
- The VOICE push-button is disengaged.

(6) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's jack panels :
- connect a boomset to HEADSET and MIC jacks.

(7) At each Stewards' station (in zones 221, 223, 241), make certain that aircraft hand microphones are in place.

(8) On overhead panel 4-211, make certain that :
- FASTEN SEAT BELTS switch is in OFF position
- NO SMKG switch is in OFF position
- STEWARD CALL indicator light/switch is disengaged
- HP VALVE 1-2-3-4 switches are in SHUT position

(9) On Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

(10) At forward Steward's station (in zone 221), make certain that :
- On panel 1-221, PASS STEREO switch is in OFF position.
- On tape reproducer control unit, VOLUME-OFF button is in OFF position.
- Pre-recorded announcement and music magazines are in place in public address (PA) tape reproducer.

(11) On shelf 5-215, make certain that magazines are in place in passenger entertainment (PE) tape reproducer.

(12) On shelf 5-216, make certain that public address amplifier selector switch is in NORM position.

(13) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
ENG 2 HP VALVE CONT	1-213	2K 131	C 3
ENG 3 HP VALVE CONT		3K 131	C 4
EMER PASS OXY CONT & IND		H1231	C11
No.1 INPH SUP		R 89	K19
PA SUP		R 139	K20
FASTEN S/BELTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21
ENG 1 HP VALVE CONT	3-213	1K 131	C 1
ENG 4 HP VALVE CONT		4K 131	C 2
No.2 INPH SUP		R 90	H 2
PASS ENT AC SUP	14-215	R 333	B 4
PASS ENT DC SUP	15-215	R 332	G18

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PASS CALL SUP	15-216	M 78	A22

(14) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 PROBE HTR SUP	13-215	1H 542	C 9
No.2 PROBE HTR SUP	14-215	2H 542	E 8
No.3 PROBE HTR SUP	14-216	3H 542	C14
No.4 PROBE HTR SUP	13-216	4H 542	C11
EMER PASS OXY CONT	1-213	H1232	C10

(15) In passenger compartment, at one passenger seat,
B Connect a E-M headsets to passenger entertainment control box and select one channel.

C. Tests

(1) Amplifier

(a) In RH side electronics rack, on shelf 5-216, place and hold public address amplifier selector switch in SPKR TEST position :
- Make certain that all Stewards' stations, toilets and passenger compartment loudspeakers are in correct operating condition.

(b) Release public address amplifier selector switch and make certain that :
- aural signal is nos longer fed to loudspeakers.

(c) On public address amplifier, place selector switch in AMP TEST position.
Check that VU-meter pointer reads 0db.

(d) On public address amplifier, place selector switch in NORMAL position.

(2) Annoucements made by crew members

(a) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :
- Engage PA key on control keyboard
- Make certain that BOOM-MASK switch is in BOOM position.

(b) At forward Stewards' station (in zone 221), on panel 1-221, place PASS STEREO switch in ON position :
- check passenger entertainment reception at
B passenger headsets.

(c) On Captain's control column handwheel, place RAD-INT PTT switch in RAD position, speak into boomset microphone and make certain that :
- passenger compartment, toilets and Steward's stations loudspeakers operate correctly
- reception is correct in the boomsets at First Officer's, Flight Engineer's and First Supernumerary's jack panels.
- the announcement replaces selected music program
B at passenger headsets.

(d) Release RAD-INT PTT switch on Captain's control column handwheel.

(e) Place and hold RAD-INT PTT switch on First Officer's control column handwheel in RAD position. Speak into boomset microphone and make certain that :
- passenger compartment, toilets and Stewards' stations loudspeakers operate correctly.
- reception is correct in the boomsets at Captain's, Flight Engineer's and First Supernumerary's jack panels.
B - reception is correct at passenger headsets.

(f) Release RAD-INT PTT switch on First Officer's control column handwheel.

(g) Place and hold First Supernumerary's RAD-INT PTT switch in RAD position. Speak into boomset microphone and make certain that :
- passenger compartment, toilets and Stewards' stations loudspeakers operate correctly
- reception is correct in the boomsets at Captain's, First Officer's and Flight Engineer's jack panels.

B - reception is correct at passenger headsets.

(h) Release First Supernumerary's RAD-INT PTT switch.

(j) Place and hold INT-R/T PTT switch on Flight Engineer's audio selector panel in R/T position. Speak into boomset microphone and make certain that :
- passenger compartment, toilets and Stewards' stations loudspeakers operate correctly.
- reception is correct in the boomsets at Captain's, First Officer's and First Supernumerary's jack panels.
B - reception is correct at passenger headsets.

(3) Announcements made by Stewards

(a) At forward Steward's station (in zone 221) press hand microphone PTT switch. Speak into the hand microphone and make certain that :
- passenger compartment, toilets and Stewards' stations speakers operate correctly
B - the announcement replaces selected music program at passenger headsets.

(b) At steward's station (in zone 223), press hand microphone PTT switch. Speak into the hand microphone and make certain that :
- passenger compartment, toilets and Stewards' stations loudspeakers operate correctly
B - the announcement replaces selected music program at passenger headsets.

(c) At steward's station (in zone 241), press hand microphone PTT switch. Speak into the hand microphone and make certain that :
- passenger compartment, toilets and Stewards' stations loudspeakers operate correctly
B - the announcement replaces selected music program at passenger headsets.

(4) Priority in Transmit Mode

(a) At a steward's station, press the hand microphone PTT switch and speak into the microphone.

(b) In the same time, at a crew member's audio selector panel, place and hold INT-R/T PTT switch in R/T position.

Speak into boomset microphone :
- Make certain that signals received in passenger compartment loudspeakers are these from the flight compartment and not those from the steward's station.

(5) Attenuation

B In conjunction with the appropriate trade Supervisor

B (a) Ensure the 4 engine AUTO IGNITION switches
B located on the Pilot's overhead roof panel are OFF
B and the IGNITION ROTARY SELECTOR at the
B Engineer's station is OFF.

B (b) At fuel panel 5-214, ensure that the four LP
B VALVE switches are in SHUT 1 position.

B (c) On panel 4-211, ensure that the HP VALVE
B 1-2-3-4- switches are placed in the SHUT
B position and that the four emergency shut
B down handles are pushed (normal position).

B (d) At the forward Steward's station select boarding
B music on and adjust to a reasonable listening
B level.

B (e) On panel 4-211, momentarily place HP VALVE 1
B switch in the OPEN position and check that the
B level of the boarding music increases.

B (f) Check that the level of the boarding music is
B reduced when the HP VALVE 1 is returned to its
B SHUT position.

B (g) Repeat checks (d) to (f) for HP VALVE switches
B 2-3 and 4.

B (h) Ensure all 4 HP VALVE switches are in the SHUT
B position on completion of this check.

(6) Captain-to-Steward Call

(a) On panel 4-211, press STEWARD CALL indicator light/switch and make certain that :
- The chime HI-LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers
- At the three Stewards' stations, the pink FLIGHT DECK CALL caption lights illuminate.

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(b) At one of the Stewards' stations, press FLIGHT DECK CANCEL push-button :
- the pink FLIGHT DECK CALL caption lights extinguish at the three Stewards' stations.

(7) Passenger-to-Steward Call

(a) On one of the passenger amenity panels in zone 221, press STEWARD CALL indicator light/switch :
- STEWARD CALL indicator light/switch illuminates

B

- Blue FWD CABIN caption lights illuminate at Stewards' stations in zones 221 and 223
- above the centre aisle, in zones 221 and 223, the passenger call overhead indicator lights illuminate.

(b) Press again previously engaged STEWARD CALL indicator light/switch on passenger amenity panel
- STEWARD CALL indicator light/switch extinguishes
- Blue FWD CABIN caption lights extinguish at Stewards' stations in zones 221 and 223
- the passenger call overhead indicator lights extinguish.

(8) Instructions to passengers

(a) On panel 4-211, place FASTEN SEAT BELTS switch in ON position :
- FASTEN SEAT BELTS signs illuminate in passenger compartment and at Stewards' panels
- The chime LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers.
- RETURN TO CABIN signs illuminate in the toilets

(b) On panel 4-211, place FASTEN SEAT BELTS switch in OFF position :
- The chime LO tone is heard again in passenger compartment, toilets and Stewards' stations loudspeakers
- FASTEN SEAT BELTS and RETURN TO CABIN signs extinguish.

(c) On panel 4-211, place NO SMKG switch in ON position :
- The chime LO tone is heard in passenger compartment, toilets and Stewards' stations loudspeakers
- NO SMOKING signs illuminate in passenger com-

partment and at Stewards' panels.

(d) On panel 4-211, place NO SMKG switch in OFF position :
- The chime LO tone is heard again in passenger compartment, toilets and Stewards' stations loudspeakers.
- NO SMOKING signs extinguish.

(9) Broadcasting of music to passengers

(a) At forward Stewards' station (in zone 221), on tape reproducer control unit :
- Turn VOLUME button clockwise and set it to intermediate position to obtain a normal audio level.
- Make certain that the WAIT caption lights associated with the announcement magazines are extinguished.
- Make certain that music is received in passenger compartment, toilets and Stewards' stations loudspeakers.

(b) Turn VOLUME button clockwise, then counter-clockwise :
- Make certain that the potentiometer operates correctly and turn the button to obtain normal audio level again.

(10) Broadcasting of pre-recorded annoucements and priority of these over music.

NOTE : When the announcement is finished, the magnetic tape rewinds to the initial position. When it is positioned, the WAIT caption light corresponding to the selected magazine extinguishes on the tape reproducer control unit.
The WAIT caption light remains illuminated if the selected magazine is not ready to operate immediately, indicating either one of the following possibilities :
- The tape including the selected announcement is not in position
- No announcement has been recorded in the tape section concerned.

(a) At forward Stewards' station (in zone 221), on tape reproducer control unit make certain that :
- WAIT caption lights corresponding to the selected announcements are extinguished.

(b) On tape reproducer control unit, press one of the announcement selection push-buttons No.2, 3 or 4.
- The WAIT caption light corresponding to the selected magazine illuminates.
- Music is no longer received in loudspeakers.
- Broadcasting of the announcement starts from the beginning of the record.
- The selected announcement is received in passenger compartment, toilets and Stewards' stations loudspeakers.
- The announcement replaces selected music pro-
B gram at passenger headsets.

(c) In Zone 221, on tape reproducer control unit, press CANCEL push-button
- Broadcasting of the annoucement stops
- Music is broadcast in loodspeakers.

(d) Repeat operations described in paragraph C.(10) (b) and (c), selecting one announcement from 5 to 8 and then from 9 to 12 :
- Check that results are identical.

(e) At forward Stewards' stations (in zone 221), on tape reproducer control unit, turn VOLUME button fully counterclockwise up to OFF position :
- Music is no longer broadcast in passenger compartment, toilets and Stewards' stations loudspeakers.

(11) Emergency Announcement Manual Control

(a) On tape reproducer control unit, make certain that the three WAIT caption lights are extinguished, then press one of the announcement selection push-button (No.5 to 12).
- The WAIT caption light corresponding to the selected magazine illuminates.
- The selected announcement is received in passenger compartment, toilets and Stewards' stations loudspeakers.

B (b) On tape reproducer control umit, press the cancel
B button, then press announcement selection push-
B button No.1 :
B - The WAIT caption light corresponding to selec-
B ted magazine (announcement 1 to 4) illuminates.
B - The emergency announcement is broadcast in
B loudspeakers.
B - The emergency announcement replaces selected

B music program at passenger headsets.

(c) During the time the emergency announcement is broadcast, press CANCEL push-button on tape reproducer control unit :
- the emergency announcement stops
- when the tape is back to initial position, the WAIT caption light corresponding to selected magazine (announcement 1 to 4) extinguishes.

(d) On tape reproducer control unit, press again announcement selection push-button No.1
- the WAIT caption light corresponding to selected magazine (announcement 1 to 4) illuminates
- the emergency announcement is heard again in loudspeakers.

(12) Emergency Announcement Automatic Control

(a) On panel 1-213, make certain that circuit breaker H1232 Map ref. (C10) is tripped, safetied and tagged.

B (b) On tape reproducer control unit press one of the
B announcement selection push-buttons No. 5 to 12.
- The WAIT caption light corresponding to the selected magazine illuminates.
- The selected announcement is broadcast in passenger compartment, toilets and Stewards' stations loudspeakers.

(c) On Flight Engineer's panel 7-214, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in ON position and make certain that :
- on tape reproducer control unit, WAIT caption light corresponding to selected magazine (announcement 1 to 4) illuminates.
- the emergency announcement is broadcast in passenger compartment, toilets and steward's stations loudspeakers.
- the announcement previously selected in step
B 1. C. (12) (b) is no longer broadcast (the emergency announcement having a top priority).
- the emergency announcement replaces selected music program at passenger headsets.

(d) During the time the announcement is broadcast, press CANCEL push-button on tape reproducer control unit and make certain that :
- the emergency announcement is still broadcast in the loudspeakers.

(e) At Flight Engineers' station, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position.

(f) On tape reproducer control unit, press CANCEL push-button.

(13) Priority of Stewards' Station Over Announcements

(a) On tape reproducer control unit in zone 221, press one of the 12 announcement selection push-buttons (except push-button No.1).
- The WAIT caption light corresponding to the selected magazine illuminates.
- The selected announcement is broadcast in loudspeakers.

(b) At one Stewards' station, press hand microphone PTT switch. Speak into microphone and make certain that:
- Stewards' voice is received in the loudspeakers while the announcement is no longer heard.

(14) Priority of Crew Members' messages over announcements.

(a) On tape reproducer control unit (in zone 221), press one of the 12 announcement selection push-buttons (except push-button No.1):
- WAIT caption light corresponding to the selected magazine illuminates
- the selected announcement is broadcast in loudspeakers.

(b) On a crew members' audio selector panel, press and hold INT-R/T PTT switch in R/T position. Speak into boomset microphone and make certain that:
- Crew members' voice is heard in the loudspeakers while the announcement from the tape reproducer is no longer heard.

RB (15) Automatic Volume Increase above Mach 1

RB (a) Pull circuit breakers R139 (PA System) (on
RB panel 1-213) and IF97 (Captains VSI) (location A3
RB on panel 2-213) and remove the PA amplifier.

RB (b) Set the resistance of the External Gain
RB Potentiometer, measured between Pins 1 and 2 of
RB Plug PIA, to 900 ohms.

RB (c) Set the PA amplifier circuit breaker (R139), the
RB resistance between Pins 1 and 2 should fall to
RB approximately 90 ohms.

RB (d) Set the VSI circuit breaker (IF97) and switch on ADC No.1. The resistance between pins 1 and 2
RB should increase to 900 ohms.

RB (e) Carry out an ADC Self Test 2 (Ref. 34-11-00,
RB Adjustment/Test) the resistance between pins 1 and
RB 2 should change from 900 ohms to 90 ohms during the test.

RB (f) Pull the PA amplifier circuit breaker (R139) and
RB refit the PA amplifier. Reset the PA amplifier
RB circuit breaker.

RB (g) Measure the volume of speech on the PA System at
RB any speaker with a sound pressure meter (Part No.
RB 1565B or similar).

RB (h) Conduct ADC Self Test 2 (Ref. 34-11-00 Adjustment/Test) and check that the volume increases by at least 3dBs from the same speaker as the check in sub-para. (g) above.

RB (16) Steward Speaker Muting

RB (a) Whilst playing the boarding music, check that the
RB public address works satisfactorily from each of
RB the flight deck and stewards' position
RB microphones.

RB (b) Whilst playing the IFE only, check the following:

RB (i) Speech from each of the stewards'
RB microphones can be heard in the passenger headsets.

RB (ii) The Flight crew speech overrides the cabin
RB crew speech.

RB (c) Check that the stewards' speakers mute when
RB talking into each of the three stewards'
RB microphones.

RB (17) Steward Speaker Volume Increase

RB (a) Whilst playing the boarding music, measure the
RB volume of the first stewards' speaker, then check
RB the volume from the mid stewards' speaker is about
RB 2dBs higher than the volume from the first
RB stewards' speaker and about 2dBs lower than the
RB volume from the rear stewards' speaker.

D. Close-Up

(1) At forward Stewards' station in zone 221, make certain that VOLUME button is turned counter-clockwise upto OFF position.

(2) At forward Stewards' station in zone 221, on panel 1-221:
- Place PASS STEREO switch in OFF position.

(3) On Captains', First Officers', Flight Engineers' and First Supernumerarys' jack panels, disconnect boomsets from BOOM and HEADSET jacks.

(4) On Captains' First Officers', Flight Engineers' and First Supernumerarys' audio selector panels:
- Disengage PA key on control keyboard.

(5) Disconnect the E-M headsets at passenger seat.

(6) Remove safety clips and tags and reset circuit breakers tripped in paragraph 2.B.(14).

(7) Install access panels 215ES and 216ES.

(8) Stop electronics racks ventilation (Ref. 21-21-00).

(9) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

3. System Test

Identical with Function Test, Refer to paragraph 2.

4. Performance Check - RASTI Method

A. Equipment and Materials

DESCRIPTION	PART NO.
Bruel & Kjaer RASTI Test Set comprising:	Type 3361L
Transmitter	Type 4225
Receiver	Type 4419
Sound Level Meter	Type 1565B or TC1565B or 2232

B. Description of RASTI Measurement

This RASTI method of performance checking the PA system provides a full assessment of the system in terms of intelligibility throughout the aircraft. The test set transmitter is used to feed a 'calibrated noise' signal of a predetermined level into the input of the PA system via one of the microphone inputs. The 'calibrated noise' signal is fed through the PA amplifiers and broadcast over the loudspeaker system throughout the aircraft.

The test set receiver, via its microphone, measures the received signal at pre-determined locations throughout the aircraft, analyses the resultant signal over a period of time and gives an output reading between 0 (zero) and 1 (one) (RASTI reading) to indicate the level of intelligibility. The minimum intelligibility (RASTI reading) being targeted for during ground checks is 0.7, this being indicative of good intelligibility.

However, during the certification process of the aircraft it was required that the aircraft be 'mapped' in terms of RASTI readings for each attendant and toilet location together with a number of specific (generally worst case) passenger seat locations. These results have established typical results for the aircraft and form a benchmark for future checks to establish any degradation in performance.

NOTE: The following checks must be carried out with the aircraft in a fully equipped and configured state i.e. all seats, galleys, partitions, furnishings, etc., installed and with minimal, external to aircraft, noise. Results will determine any maintenance action necessary.

C. Description of Tests

The two test procedures are described below. One offers a simple check for meeting AMS RASTI requirements and determining if there is any significant degradation in the performance of individual PA speakers. The second test offers the full RASTI procedure as required by Specification 15 for certification of the PA system.

D. Procedure 1 - Speaker Volume Check

(1) Set Captain's VSI circuit breaker (A3 on panel 2-213).

(2) Switch on ADC 1.

(3) Link up the RASTI transmitter to any of the crew jack panel microphone sockets and set a volume of 100 dBA as measured at the front steward's panel.

(4) Use the sound level meter and check that the volume at each of the speakers on the aircraft are within 2 dB of the values stated below.

	dBA
Front Steward	100
Mid Steward	102
Rear Steward	104
Rows 1 to 9	100
Row 10	102
Rows 11 to 14	100
Rows 15 to 19	102
Rows 20 to 26	104
Toilets	98

E. Procedure 2 - RASTI Intelligibility Measurement

(1) Set Captain's VSI circuit breaker (A3 on panel 2-213).

(2) Switch on ADC 1.

(3) At first cabin speaker check sound level while speaking into cockpit headset microphone. It should be approx. 95 dBA.

(4) Plug in RASTI transmitter equipment to the HAND MIC jack at Captain's console jack panel and select 'ON', 10 dB + REF and external speaker. Set output volume to 95 dBA through the external speaker adjustment on the front of the RASTI transmitter or the lead potentiometer box.

(5) Pull Captain's VSI circuit breaker and check that volume increases. Then reset the circuit breaker so that volume reverts back to 95 dBA.

(6) Conduct RASTI check.

(a) Set RASTI receiver controls as follows:

- Power - ON
- Measurement period - 8 s (pushbutton 0)
- Calculation - RASTI (pushbutton 7).

(b) At each designated measurement location, hold test set microphone at normal head height position, depress 'Single' measurement pushbutton, wait for 8 s (maintaining silence) and read/record RASTI value shown in display. Repeat only as necessary to achieve consistent reading.

(c) RASTI values measured in (b) above should be compared with the quoted figures in Table 1 and no reading in the cabin shall in any case be less than a minimum of 0.7.

Significantly lower readings are indicative of a system degradation requiring troubleshooting and maintenance action in the applicable area.

(d) Switch OFF and disconnect RASTI test set.

(7) Flight Noise Simulation RASTI Check

One of the factors affecting speech intelligibility is the local background noise at the listener's position. This background noise may not always be present when the speech intelligibility tests are being made, and in these applications the RASTI receiver's internal noise floor facility can be used to simulate the effect of the local background noise.

This is done by entering an additional noise floor in each of the octave bands. The additional noise floor is added to the measured signal in the RASTI receiver and results in a reduction in the signal modulation.

(a) Ensuring fuel release precautions first, set HP cock to simulate engines running PA volume. Then pull Captain's VSI circuit breaker and conduct RASTI check with simulated noise values as shown in Table 1.

(b) The procedure for entering the noise floor is as follows:

- Select the octave band in which the noise floor is to be entered by pressing the '500 Hz' or '2 kHz' pushkey.
- Press and hold the 'Stop/2nd' pushkey.
- Press the 'Level' pushkey momentarily.
- Enter the required noise floor in dB to one decimal place using the numbered pushkeys. The decimal point is automatically entered.
- Release the 'Stop/2nd' pushkey.
- Repeat the procedure to enter a noise floor for any other required octave band.

NOTE: The noise floor entered in each band may be viewed by selecting the octave band of interest, then, while holding 'Stop/2nd' pushkey depressed, press 'Level' pushkey momentarily. When the instrument is first switched on a value of -00 dB is assumed for the additional noise floor in each band (displayed and entered as 0.0).

RASTI CHECKS

RESULTS SHEET

A/C Type CONCORDE

Reg'n G=BOA
Date Checked
O/P Level (dBA) 95

Location	Ground Typical Values	Ground Readings	Simulated Cruise Readings	at: noise floor
AS1 (LH Steward)	0.70			2 kHz-73 dBA
AS2 (RH Steward)	0.93			and
AS3 (RH mid Steward)	0.90			500 Hz-88 dBA
AS4 (LH mid Steward)	0.95			"
AS5 (LH rear Steward)	0.81			"
AS6 (RH rear Steward)	0.70			"
AW1 (RH Front Galley)	0.80			"
AW2 (LH Front Galley)	0.76			"
AW3 (RH Rear Galley)	0.70			"
AW4 (Front Galley)	0.78			"
T1 (Front Toilet)	0.89			2 kHz-69 dBA
T2 (LH mid Toilet)	0.81			and
T3 (RH mid Toilet)	0.88			500 Hz-84 dBA
P1 (Seat 1B)	0.78			"
P2 (Seat 4A)	0.96			"
P3 (Seat 7B)	0.70			"
P4 (Seat 10A)	0.95			"
P5 (Seat 12B)	0.93			"
P6 (Seat 16A)	0.94			"
P7 (Seat 19B)	0.94			2 kHz-73 dBA
P8 (Seat 22A)	0.96			and
P9 (Seat 24B)	0.97			500 Hz-88 dBA
P10 (Seat 26A)	0.93			"

Table 1

END OF THIS SECTION

NEXT

PASSENGER LOUDSPEAKER - REMOVAL/INSTALLATION

1. General

The passenger loudspeakers are installed on speaker/sign panels located below the luggage bins. Each panel assembly features :
- a loudspeaker, a loudspeaker transformer, two passenger signs, NO SMOKING and FASTEN SEAT BELTS and their associated lighting bulbs.

These panel assemblies are located on LH and RH sides of passenger compartment.

2. Passenger Loudspeaker and Loudspeaker Transformer

A. Remove Speaker/Sign Panel

Refer to chapter 25-21-23, Removal/Installation.

B. Remove Loudspeaker (Ref. Fig. 401)

(1) Disconnect loudspeaker (3) from transformer (9).

(2) Remove the four screws (1) and retain washers (2).

(3) Lift up and remove loudspeaker (3) from panel (6), taking care to avoid damage to loudspeaker cone.

(4) Remove gasket (4) and retain washers (5).

(5) Check condition of inserts (7).

CAUTION : DAMAGED INSERTS ARE NOT REPLACABLE.

C. Preparation of Replacement Component

(1) Visually check condition of loudspeaker.

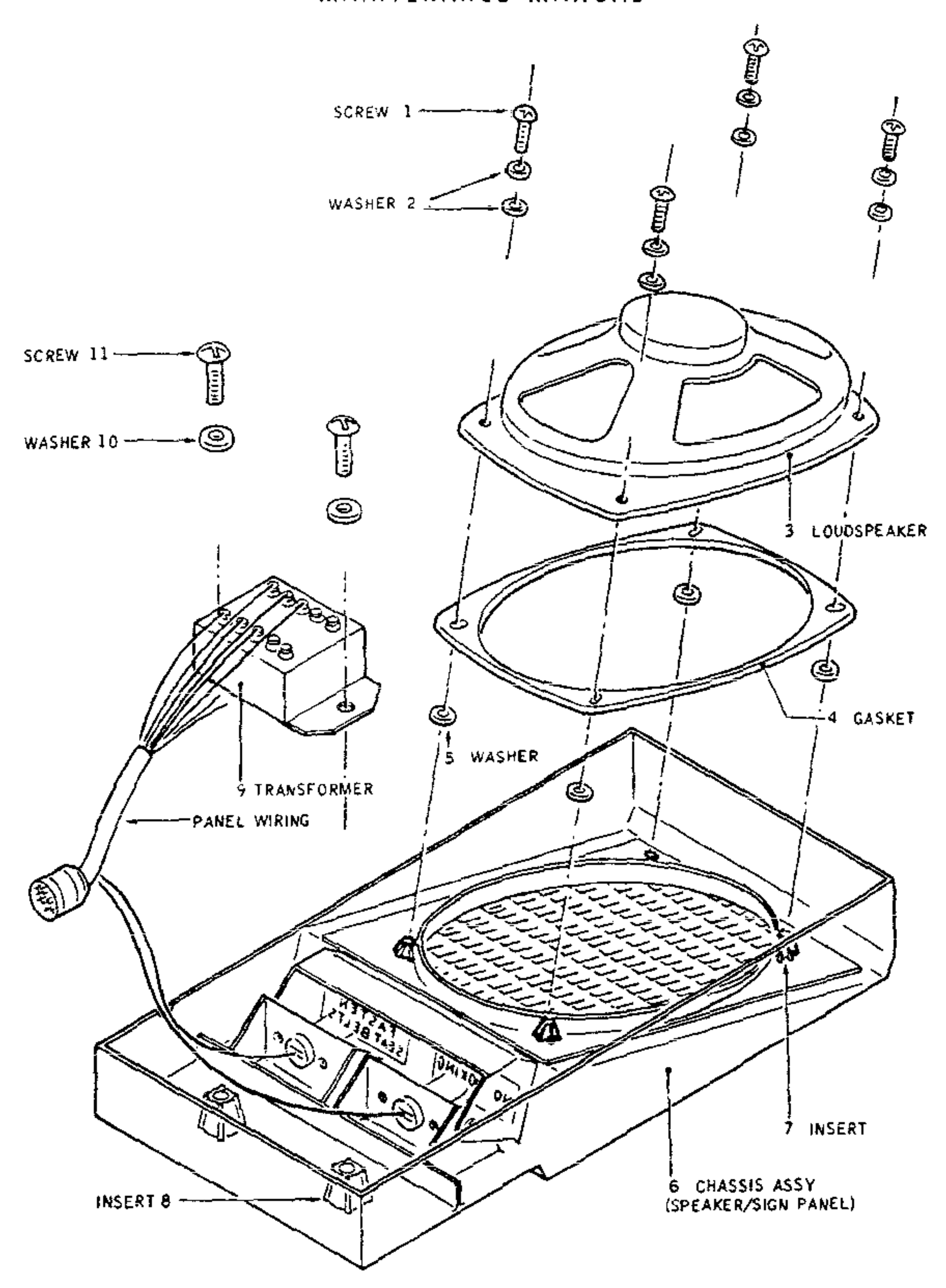
(2) Make certain that loudspeaker interface on speaker/sign panel assembly does not show evidence of cracks, scratches, etc...

D. Install Loudspeaker (Ref. Fig. 401)

(1) Install washers (5) and gasket (4).

(2) Slowly apply loudspeaker (3) on gasket (4).

(3) Install washers (2), screws (1). Do not overtighten



RB

Passenger Loudspeaker and Transformer -
Removal/Installation
Figure 401

the screws to avoid deterioration of inserts (7).

(4) Connect loudspeaker (3) to transformer (9) as follows :
- terminal 10 of transformer to red spot terminal of loudspeaker.
- terminal 8 of transformer to the other terminal of loudspeaker.

E. Removal of Loudspeaker Transformer
(Ref. Fig. 401)

(1) Disconnect loudspeaker (3) from transformer (9).

(2) Disconnect transformer (9) from aircraft wiring.

(3) Remove screws (11) and retain washers (10).

(4) Remove transformer (9).

(5) Check condition of inserts (8).

CAUTION : DAMAGED INSERTS ARE NOT REPLACABLE.

F. Preparation of Replacement Component

(1) Visually check condition of transformer.

(2) Make certain that transformer interface on panel does not show evidence of cracks, scratches, etc...

G. Install loudspeaker transformer (Ref. Fig. 402)
(Ref. Fig. 401)

(1) Install loudspeaker transformer (9).

(2) Install the two washers (10), the two screws (11). Do not overtighten to avoid deterioration of inserts (8).

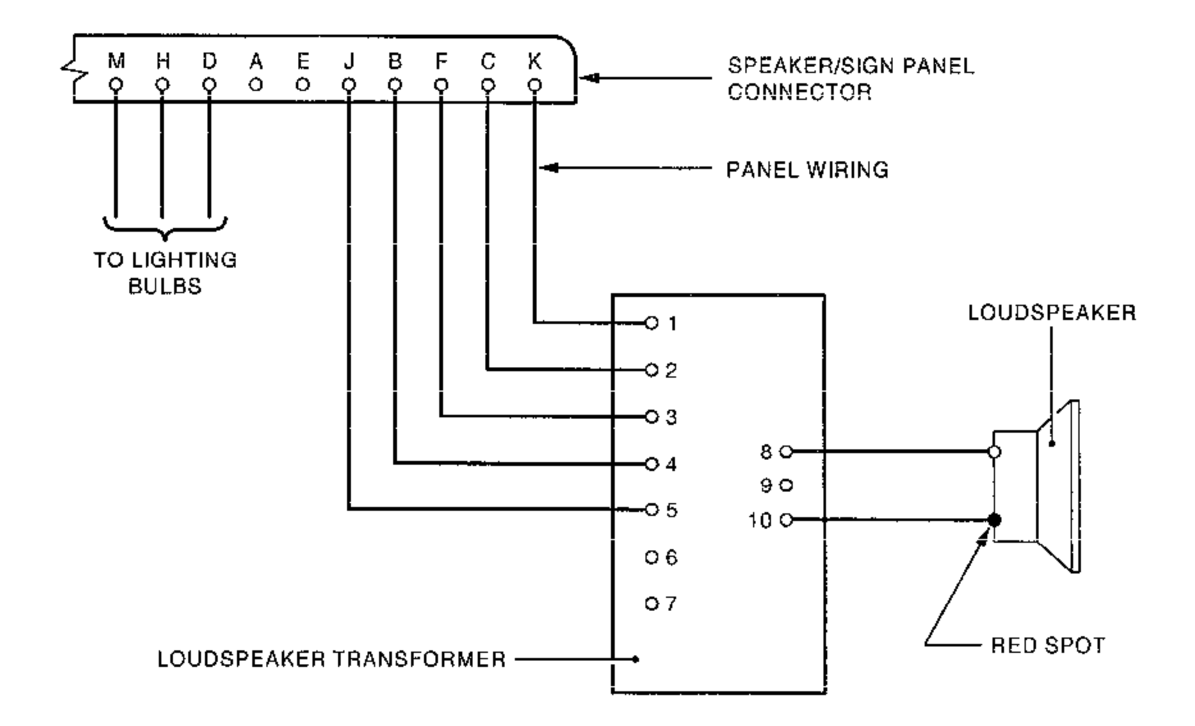
(3) Connect panel wiring to terminals of loudspeaker transformer.

(4) Connect loudspeaker to transformer.

H. Install Speaker/Sign Panel

(1) Install speaker/sign panel assembly (Ref. 25-21-23, Removal/Installation).

I. Test



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RB

Transformer/Loudspeaker Interconnection
Figure 402

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) Make certain that the circuit breakers previously tripped in 25-21-23, Removal/Installation are reset.

(4) On overhead panel 4-211, place FASTEN SEAT BELTS switch in ON position and on speaker/sign panel previously removed and re-installed, make certain that:

- FASTEN SEAT BELTS sign illuminates
- the chime LO tone is heard.

(5) On overhead panel 4-211, place FASTEN SEAT BELTS switch in OFF position and make certain that:

- FASTEN SEAT BELTS sign extinguishes
- the chime LO tone is heard again.

(6) On overhead panel 4-211, place NO SMKG switch in ON position and make certain that:

- NO SMOKING sign illuminates

- the chime LO tone is heard.

(7) On overhead panel 4-211, place NO SMKG switch in OFF position.
- NO SMOKING sign extinguishes
- the chime LO tone is heard again.

J. Close-Up

(1) Stop electronics rack ventilation (Ref. 21-21-00).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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STEWARD LOUDSPEAKER - REMOVAL/INSTALLATION

1. General

These loudspeakers protected by a grille are installed at the lower part of all Steward's panels in zones 221, 223 and 241. Tilting the panels forwards gives access to the loudspeakers. Removal/Installation procedure for all loudspeakers, whatever their location is identical. Therefore, the procedures descri= bed below are typical and apply to all loudspeakers.

2. Steward's Loudspeaker

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) Trip, safety and tag the following circuit breakers as appropriate :

(a) Loudspeaker at forward Steward's call panel (panel 1).

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PA SUP	1-213	R 139	K20
PASS CALL SUP	15-216	M 78	A22

(b) Loudspeakers at centre and rear Steward's control panels (panels 2 and 3)

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PA SUP	1-213	R 139	K20
FASTEN S/BELTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
CABIN NIGHT LTS SUP	5-213	L 455	D19

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
FLT DECK ROOF	14-215	L 232	C11
PASS CALL SUP	15-216	M 78	A22
VESTIBULE & BOARDINGS LTS SUP	25-216	L 692	C 1

(2) On Steward's panel concerned, disengage quick release fasteners, pivot panel downwards.

NOTE : Make certain that telephone handset remains on hook during this operation.

C. Remove (Ref. Fig. 401)

(1) Mark wiring connections and disconnect loudspeaker (5).

(2) Remove the four screws (6), washers (5) while holding loudspeaker.

(3) Remove loudspeaker from Steward's panel (1), taking care to avoid damage to loudspeaker cone.

(4) Remove gasket (3).

(5) Check condition of inserts (2).

CAUTION : DAMAGED INSERTS ARE NOT REPLACABLE.

D. Preparation of Replacement Component

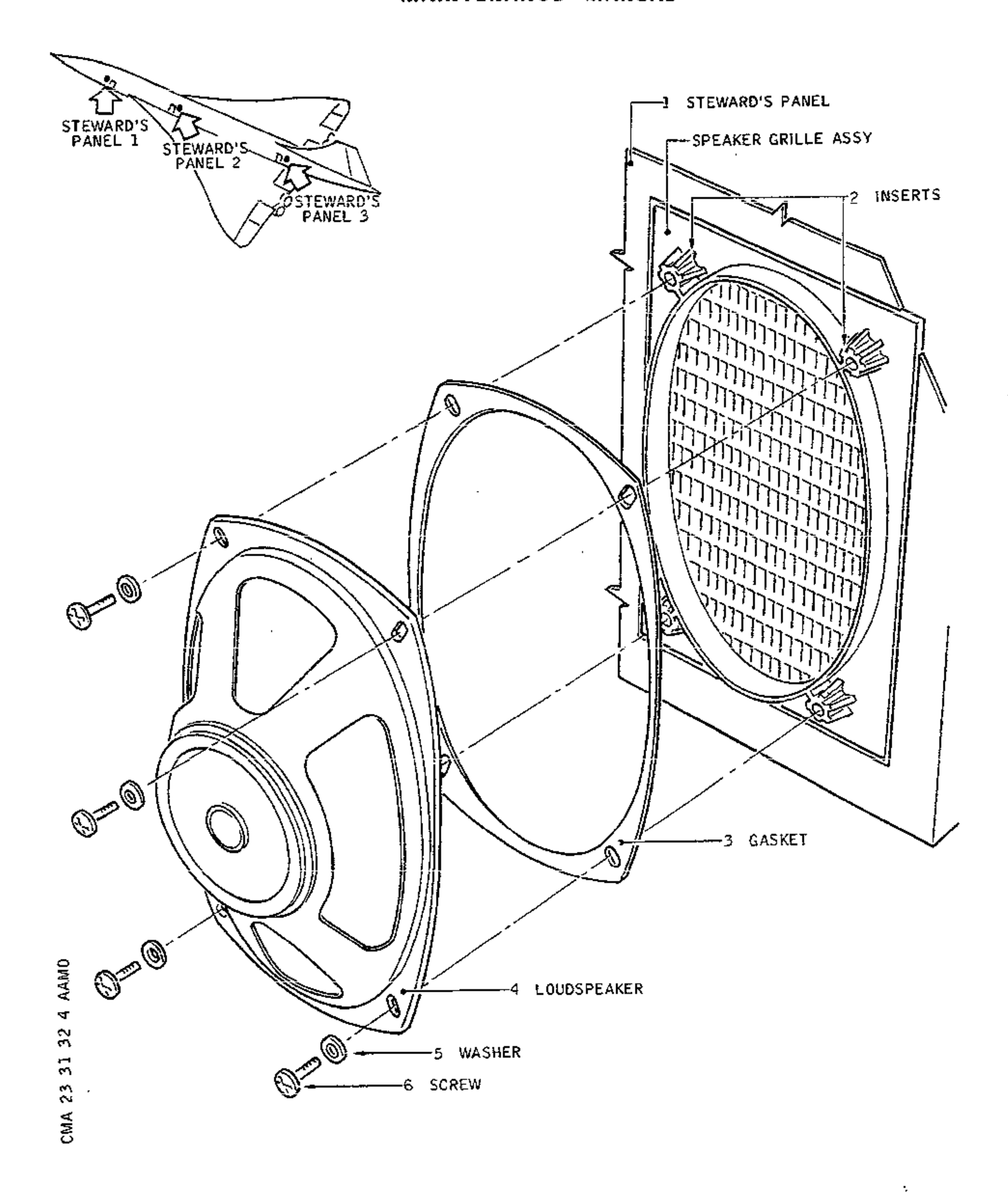
(1) Visually check condition of loudspeaker.

(2) Make certain that loudspeaker interface on the grille assembly does not show evidence of cracks, scratches etc...

E. Install (Ref. Fig. 401)

(1) Install loudspeaker gasket (3).

(2) Slowly apply loudspeaker (4) on gasket (take care not to damage loudspeaker cone).



Steward's Loudspeaker - Removal/Installation
Figure 401

(3) Install washers (5), screws (6). Do not overtighten screws to avoid deterioration of inserts (2).

(4) Connect loudspeaker to wiring in accordance with marking previously made on removal.

F. Test

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) Remove safety clips and tags and reset circuit breakers previously tripped in paragraph 2.B (1).

(4) In flight compartment, on overhead panel 4-211, press then release STEWARD CALL push-button and on Steward's panel concerned make certain that :
- the chime HI/LO tone is heard at loudspeaker
- pink FLIGHT DECK CALL sign illuminates

(5) On Steward's panel concerned, press then release FLIGHT DECK CALL indicator light/switch : pink FLIGHT DECK CALL sign extinguishes.

G. Close-Up

(1) Stop electronics rack ventilation (Ref. 21-21-00).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) Return Steward's panel in position and safety with quick-release fasteners.

3. Steward's Loudspeaker Transformer

A. Equipment and Materials

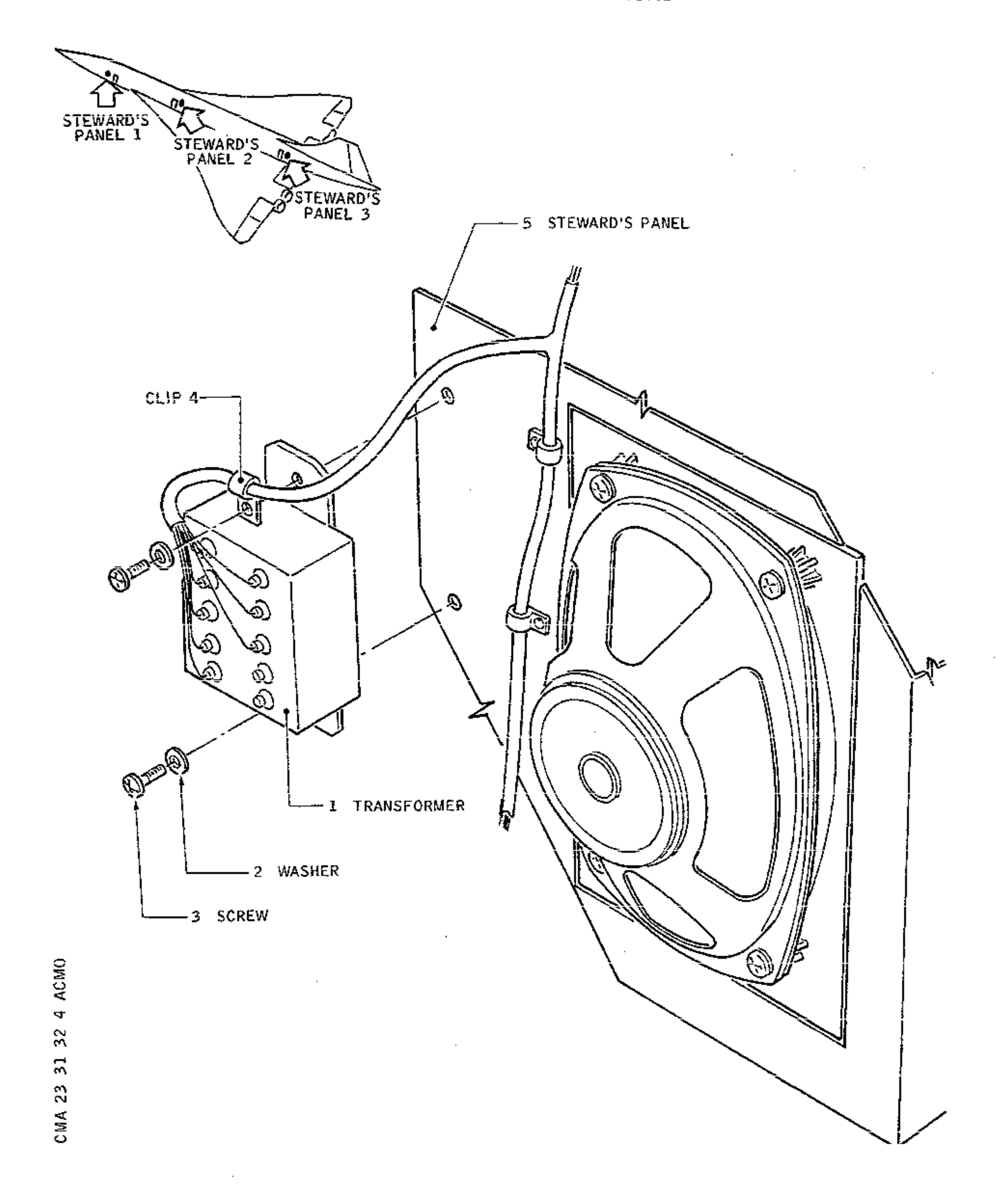
(1) Same equipment as in Paragraph 2.A.

B. Prepare

(1) Repeat operations described in Paragraph 2.B.

C. Remove (Ref. Fig. 402)

(1) Mark wiring and disconnect transformer (1).



Steward's Loudspeaker Transformer
Removal/Installation
Figure 402

(2) Remove the two screws (3), washers (2) while holding transformer.

(3) Remove clip (4) and remove transformer (1) from Steward's panel (5).

D. Preparation of Replacement Component

(1) Visually check condition of transformer.

(2) Make certain that transformer interface on Steward's panel does not show evidence of cracks, scratches, etc...

E. Install
(Ref. Fig. 402)

(1) Position transformer (1) on Steward's panel (5).

(2) Engage wiring inside clip (4).

(3) While holding transformer, install clip, washers (2), the two screws (3) and tighten.

(4) Connect transformer in accordance with marking previously made on removal.

F. Test

(1) Repeat tests described in Paragraph 2.F.

G. Close-Up

(1) Repeat operations described in Paragraph 2.G.

PUBLIC ADDRESS AMPLIFIER - REMOVAL/INSTALLATION

1. General

The public address amplifier (R137) is installed in the RH electronics rack, shelf 5-216.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps	
Blanking Plate (for Ventilation Outlets)	

B. Prepare

(1) On overhead panel 4-211 make certain that :

- FASTEN SEAT BELTS switch is in OFF position
- NO SMKS Switch is in OFF position
- STEWARD CALL push-button is released.

(2) Trip safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PA SUP	1-213	R 139	K20
FASTEN S/BELTS SUP		W 191	L 8
NO SMOKING SUP		W 192	L 9
PASS CALL SUP	15-216	M 78	A22

(3) On RH electronics rack, remove panel 216ES providing access to shelf 5-216.

C. Remove

Refer to 23-00-00, paragraph 2.D., Removal/Installation.

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D. Preparation of Replacement Component

Refer to 23-00-00, paragraph 2.E., Removal/Installation.

E. Installation

Refer to 23-00-00, paragraph 2.F., Removal/Installation.

F. Tests

Carry out an operational test of public address amplifier, (Ref. 23-31-33, Adjustment/Test).

G. Close-Up

On RH electronics rack, install panel 216ES.

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PUBLIC ADDRESS AMPLIFIER - ADJUSTMENT/TEST

1. General

Adjustment/Test of public address amplifier will be performed after removal/installation or replacement of unit.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Remove safety clips and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PA SUP	1-213	R139	K20
FASTEN S/BELTS SUP		W191	L 8
No SMOKING SUP		W192	L 9
PASS CALL SUP	15-216	M 78	A22

(2) Connect electrical ground power unit and energize the aircraft electrical network, (Ref. 24-41-00, Servicing)

(3) Operate electronics racks ventilation (Ref. 21-21-00).

C. Tests

(1) In RH electronics rack, shelf 5-216, place amplifier AMP-TEST-NORMAL-SPKR TEST selctor switch :

(a) In SPKR TEST position and hold
- audio signal is received in all loudspeakers (in passenger cabin, toilets, Stewards' stations)

(b) Release selector switch from SPKR TEST position
- audio signal is no longer heard in loudspeakers

(c) In AMP TEST position
- VU-meter pointer reads 0 dB

(d) In NORMAL position
- amplifier is operative

(2) On panel 2-221, at forward Steward's station, speak in hand microphone while holding PTT switch pressed
- reception at passenger compartment and toilets loudspeakers.

(3) On overhead panel 4-211, place FASTEN SEAT BELTS or No SMKG switch in ON position
- In passenger compartment, toilets, and Stewards' stations, loudspeakers LO tone chime is heard.
- appropriate signs illuminate

(4) On overhead panel 4-211, place FASTEN SEAT BELTS or No SMKG switch in OFF position
- appropriate signs extinguish
- in passenger compartment, toilets and Stewards' stations loudspeakers LO tone chime is heard again

D. Close-up

(1) Stop electronics racks ventilation (Ref. 21-21-00).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

PUBLIC ADDRESS TAPE REPRODUCER/CONTROL UNIT - REMOVAL/INSTALLATION

1. General

The public address tape reproducer and control unit are installed in the forward amenity stowage in zone 221.

2. Public Address Tape Reproducer

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps	
Blanking Plate (for Ventilation Outlets)	

B. Prepare

(1) At Forward Steward's station (zone 221), on panel 1-211, make certain that :

(a) TAPE REPRODUCER switch is in OFF position

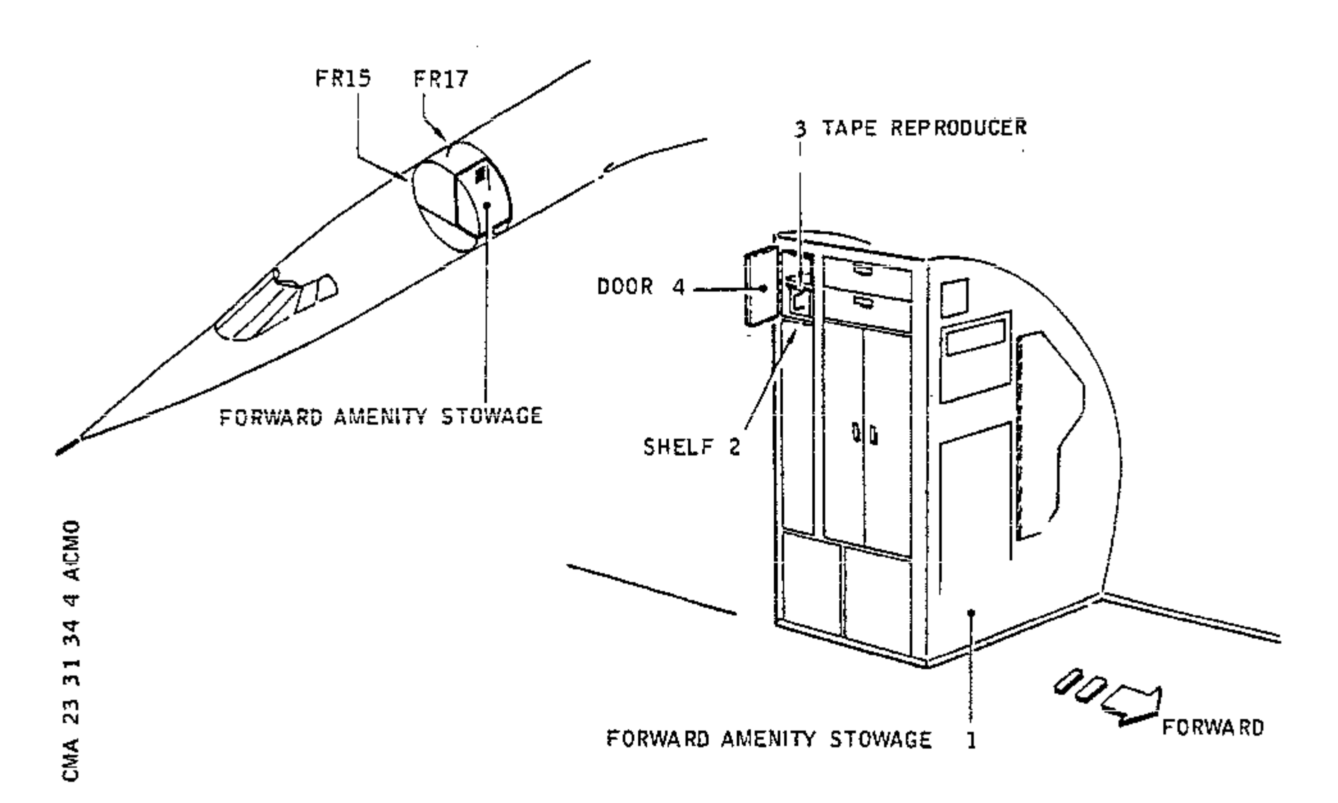
(b) VOLUME control potentiometer is turned fully counterclockwise in LOW position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY IND.	1-213	H1231	C11
PA SUP		R 139	K20
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21

C. Remove

(1) Tape reproducer location (Ref. Fig. 401)



Public Address Tape Reproducer Location
Figure 401

(a) On forward amenity stowage (1), open access door (4) for access to shelf (2) and tape reproducer (3).

(2) Remove tape reproducer (Ref. 23-00-00, Removal/ Installation).

(3) Open tape reproducer front panel and remove announcement and music magazines.

D. Preparation of Replacement Component

Refer to 23-00-00, Removal/Installation.

E. Install

(1) Install tape reproducer on rack (Ref. 23-00-00, Removal/Installation).

(2) Open tape reproducer front panel and install announcement and music magazines.

F. Tests

(1) Carry out an operational test of tape reproducer system (Ref. 23=31=34, Adjustment/Test).

G. Close-Up (Ref. Fig. 401)

(1) Close access door (4) on forward amenity stowage (1).

3. Tape Reproducer Control Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps	

B. Prepare

(1) At forward Steward's station (zone 221), on panel 1-221, make certain that :

(a) TAPE REPRODUCER switch is in OFF position

(b) VOLUME control potentiometer is turned fully counterclockwise in LOW position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMERG PASS OXY IND.	1-213	H1231	C11
PA SUP		R 139	K20
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21

C. Remove (Ref. Fig. 402)

(1) In forward amenity stowage (1), open access door (2).

(2) Through access door (2), remove two bolts (6) attaching mounting bracket (5) to shelf (10).

(3) Remove control unit (3) from seating (8).

(4) Disconnect electrical connector (9) from control unit connector (4).

(5) Cap electrical connectors.

(6) On removed control unit, remove four screws (7) attaching mounting bracket (5) to control unit.

D. Preparation of Replacement Component

(1) Visually check condition of replacement control unit.

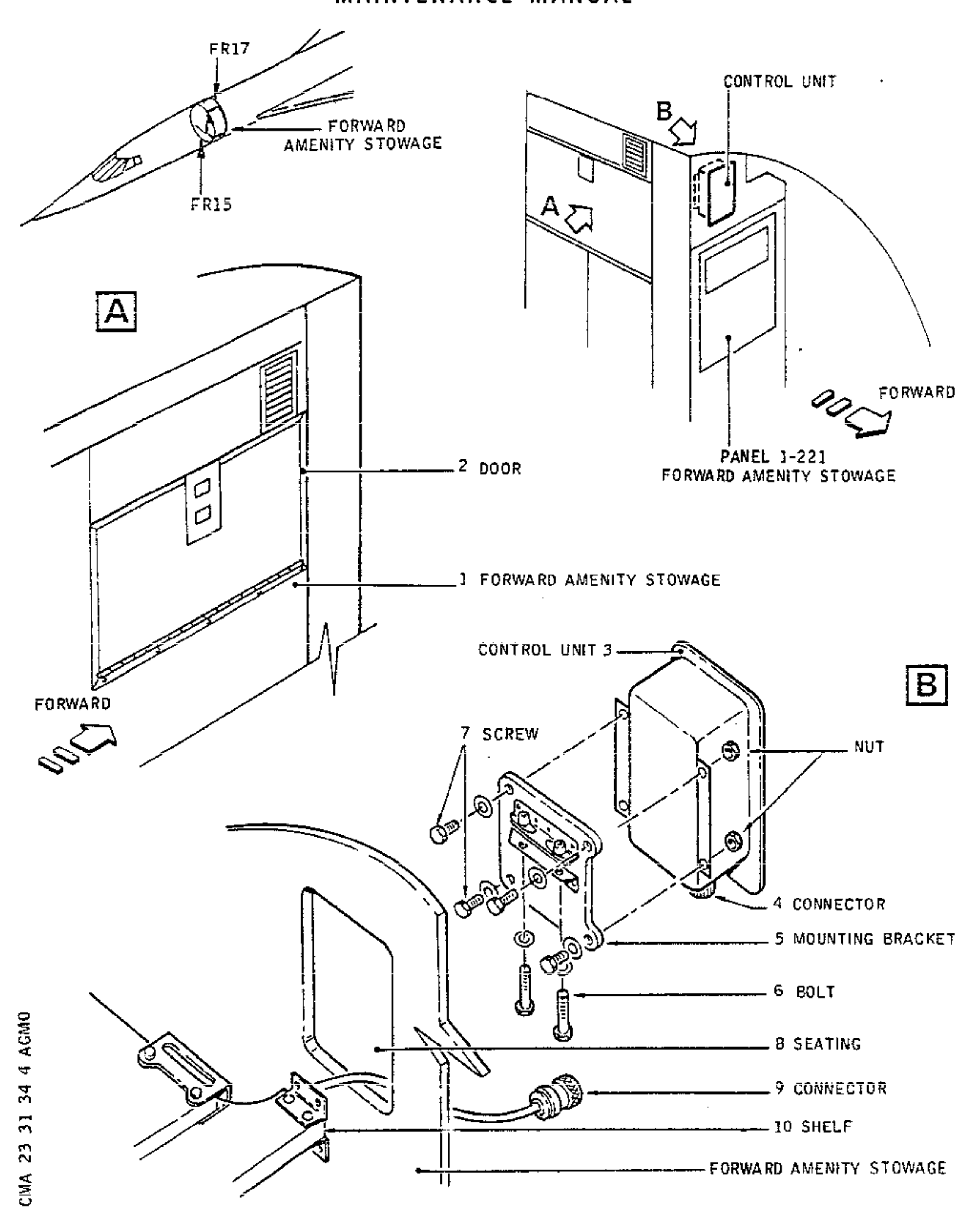
(2) Check that electrical connector is in correct condition and that pins do not show traces of corrosion.

E. Install (Ref. Fig. 402)

(1) On new tape reproducer control unit, attach mounting bracket (5) to control unit using four screws (7).

(2) Uncap electrical connectors.

(3) Position control unit (3) on seating (8), then connect



Tape Reproducer Control Unit - Removal/Installation
Figure 402

connector (9) to control unit connector (4).

(4) Through access door (2), install two bolts (6) to attach mounting bracket (5) to shelf (10).

(5) Close access door (2) on forward amenity stowage.

F. Tests

(1) Carry out an operational test of tape reproducer system (Ref. 23-31-34, Adjustment/Test).

G. Close-up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

PUBLIC ADDRESS TAPE REPRODUCER/CONTROL UNIT - REMOVAL/INSTALLATION

1. General

The public address tape reproducer and control unit are installed in forward amenity stowage in zone 221.

2. Public Address Tape Reproducer

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps	
Blanking Plate (for Ventilation Outlets)	

B. Prepare

(1) At Forward Steward's station (zone 221), on tape reproducer control unit, make certain that VOLUME potentiometer is placed in OFF position.

(2) Trip, safety and tag the following circuit breakers :

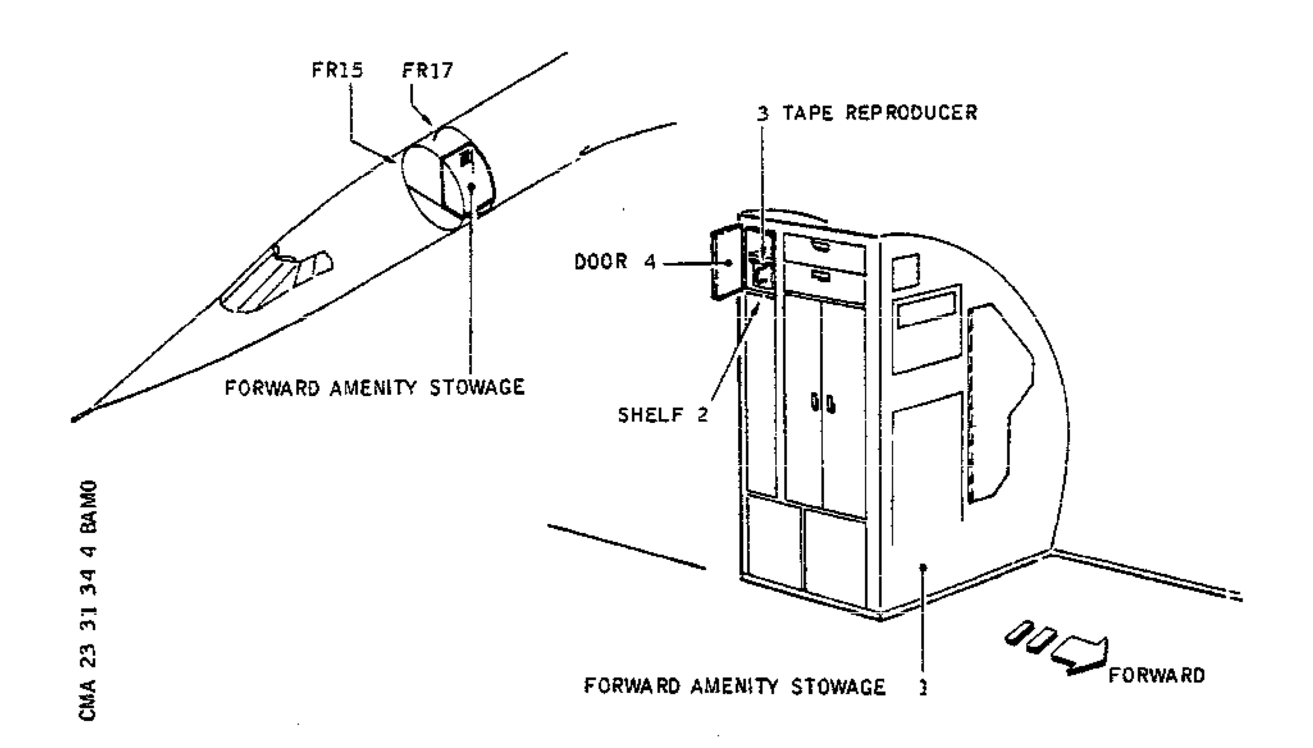
SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY IND	1-213	H1231	C11
PA SUP		R 139	K20
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21

C. Remove

(1) Tape reproducer location (Ref. Fig. 401)

(a) On forward amenity stowage (1), open door (4) for access to shelf (2) and tape reproducer (3).

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Tape Reproducer Location
Figure 401

(2) Remove tape reproducer (Ref. 23-00-00, Removal/Installation, Paragraph 2.D.).

(3) Open tape reproducer front panel and remove announcement and music magazines.

D. Preparation of Replacement Component

Refer to 23-00-00, Removal/Installation, Paragraph 2.E.

E. Install

(1) Install tape reproducer on rack (Ref. 23-00-00, Removal/Installation, Paragraph 2.F.).

(2) Open tape reproducer front panel and install announcement and music magazines.

F. Tests

(1) Carry out an operational test of tape reproducer system (Ref. 23-31-34, Adjustment/Test).

G. Close-Up
(Ref. Fig. 401)

(1) Close access door (4) on forward amenity stowage (1).

3. Tape Reproducer Control Unit

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps	

B. Prepare

(1) At Forward Steward's station (zone 221), on tape reproducer control unit, make certain that VOLUME control potentiometer is in OFF position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMERG PASS OXY IND	1-213	H1231	C11
PA SUP		R 139	K20
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21

C. Remove (Ref. Fig. 402)

(1) On control unit (6), remove VOLUME control knob (1).

(2) Remove four screws (2) attaching panel (3) to control unit (6).

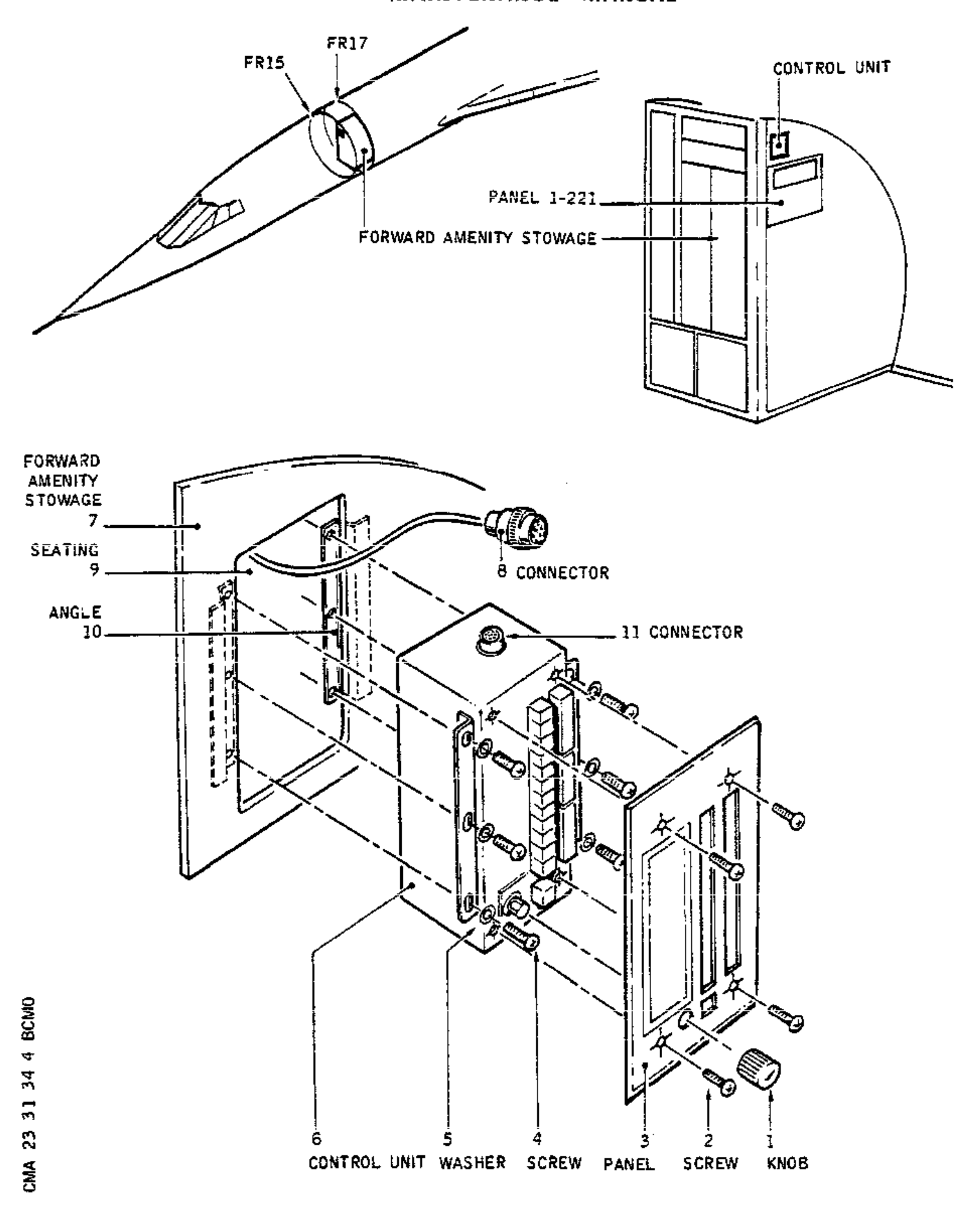
(3) Remove six screws (4) attaching control unit (6) to angles (10). Retain screws (4) and washers (5).

(4) Remove control unit (6) from seating (9).

(5) Disconnect electrical connector (8) from control unit connector (11).

(6) Cap electrical connectors.

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Tape Reproducer Control Unit - Removal/Installation
Figure 402

(7) On removed control unit, install panel (3) using four screws (2), then install VOLUME control knob (1).

D. Preparation of Replacement Component

(1) Make certain that replacement control unit is in correct condition.

(2) Check that electrical connector is in correct condition and that pins do not show traces of corrosion.

E. Install
(Ref. Fig. 402)

(1) On new tape reproducer control unit, remove knob (1), remove four screws (2) attaching panel (3) to control unit (6).

(2) Uncap electrical connectors.

(3) Connect electrical connector (8) to control unit connector (11); position control unit (6) on seating (9).

(4) Attach control unit (6) to angles (9) using six screws (4) and washers (5).

(5) On control unit, attach panel (3) using four screws (2).

(6) Install VOLUME control knob (1) on control unit (6).

F. Tests

(1) Carry out an operational test of tape reproducer system (Ref. 23-31-34, Adjustment/Test).

G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

PUBLIC ADDRESS TAPE REPRODUCER/CONTROL UNIT - ADJUSTMENT/TEST

1. General

Adjustment/test of public address tape reproducer/control unit will be performed after removal/installation or replacement of one or both units.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) On panel 1-221, at forward Stewards' station, make certain that TAPE REPRODUCER switch is in OFF position.

(2) Remove safety clips and tags and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY IND	1-213	H1231	C11
PA SUP		R 139	K20
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21

(3) On panel 1-213, trip EMERG PASS OXY CONT circuit breaker H1232, map ref. C10.

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(5) Operate electronics racks ventilation (Ref. 21-21-00).

(6) At Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

C. Test

(1) Pre-recorded announcement broadcasting

(a) At forward Steward's station, on tape reproducer control unit.

(a1) Press A, B or C magazine selection push-button.

(a2) Press one track selection push-button, numbered 1 to 8.

NOTE : Selection of A1 cannot be manually performed since it is automatically triggered by the emergency oxygen announcement.

(a3) Make certain that the status light located on LH side of engaged magazine selection push-button is extinguished.

(b) On tape reproducer control unit, press ANN push-button.

(b1) The engaged magazine and track selection push-buttons and associated status light illuminate.

(b2) The announcement is received in the loud-speakers in passenger compartment, toilets and Stewards' stations.

NOTE : At the end of the announcement, the tape rewinds to the initial position and the status light extinguishes.

(2) Emergency announcement broadcasting (magazine A, track 1).

(a) While the announcement previously selected is in progress, press ANN push-button on tape repro-ducer control unit.

(a1) The engaged magazine and track selection push-buttons and associated status light illuminate.

(a2) The announcement is received in all loud-speakers.

(b) On Flight Engineer's panel 7-214, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in ON position.

(b1) The announcement in progress is interrupted and the emergency announcement is received in the loudspeakers.

(b2) Place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position.

(c) On tape reproducer control unit press CANCEL push-button.

(c1) The tape of selected magazine rewinds to its initial position.

(3) Music broadcasting

(a) On tape reproducer control unit, press CANCEL push-button.

(b) On forward Steward's panel 1-221

(b1) Place TAPE REPRODUCER switch in ON position.

(b2) Turn VOLUME control potentiometer clockwise.

(c) In forward amenity stowage (zone 221), on tape reproducer front panel, place BGM selector switch in position 1, 2, 3 or 4.

(c1) Make certain that selected music programme is received in loudspeakers in passenger compartment, toilets and Stewards' stations.

(d) On forward Steward's panel 1-221

(d1) Place TAPE REPRODUCER switch in OFF position. The music programme is no longer received in the loudspeakers.

(d2) Turn VOLUME control potentiometer counter-clockwise.

D. Close-Up

(1) On panel 1-213, reset EMERG PASS OXY CONT circuit breaker H1232, map ref. C10.

(2) Stop electronics racks ventilation (Ref. 21-21-00).

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

1. General

Adjustment/test of public address tape reproducer/control unit will be performed after removal/installation or replacement of one or both units.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) On panel 1-221, at forward Steward's station, make certain that TAPE REPRODUCER switch is in OFF position.

(2) Remove safety clips and tabs and reset the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
EMER PASS OXY IND	1-213	H1231	C11
PA SUP		R 139	K20
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21

(3) On panel 1-213, trip EMERG PASS OXY CONT circuit breaker H1232, map ref. C10.

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(5) Operate electronics racks ventilation (Ref. 21-21-00)

(6) At Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

C. Test

(1) Prerecorded announcement broadcasting.

(a) At forward Steward's station, on tape reproducer control unit, press one of the dozen magasine selection push-buttons (except button 1, reserved for the emergency announcement), and check that :

(a1) WAIT status light corresponding to the magasine selected illuminates.

(a2) The announcement is received in the loudspeakers in the passenger compartment, toilets and Steward's stations.

(a3) At the end of the announcement the WAIT status light extinguishes and the tape rewinds to its original position.

(2) Emergency announcement broadcasting

(a) At forward Steward's station, on tape reproducer control unit, select an announcement on one of the push-buttons No.2 to 12.

(a1) WAIT status light corresponding to the tape selected illuminates.

(a2) The announcement is received in all loudspeakers.

(b) On Flight Engineer's panel 7-214, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in ON position, and make certain that :

(b1) WAIT status light corresponding to push-buttons 1 to 4 illuminates.

(b2) The previously broadcast announcement is interrupted to enable the emergency announcement to be received in the loudspeakers.

(c) On Flight Engineer's panel 7-214, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position.

(3) Music broadcasting

(a) At forward Steward's station, on tape reproducer

control unit :

(a1) Turn volume control potentiometer clockwise then place it in mid position to obtain normal sound level.

(a2) Make certain that the music is received in all loudspeakers in passenger compartment, toilets and Stewards' stations.

D. Close-Up

(1) On panel 1-213, reset EMERG PASS OXY CONT circuit-breaker H1282, mpa Ref. C10.

(2) Stop electronics rack ventilation (Ref. 21-21-00).

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

PASSENGER ENTERTAINMENT - DESCRIPTION AND OPERATION

1. General

The passenger entertainment system transmits music programs at each passenger seat.

RB Stereophonic programs are played from pre-recorded discs
RB located in the Compact Disc Reproducer.

An individual selection of the various programs available is provided on each Passenger Control Unit (PCU) enabling
B passengers to listen to music programs through the Electro-
B magnetic (E-M) headsets connected to the control units.

2. System Components

RB One passenger entertainment Compact Disc Reproducer R330.
One passenger entertainment Amplifier R331.
One PCU at each passenger seat
(zones 221, 222, 223, 224, 231, 232, 233, 234, 241, 242).
E-M headsets at each passenger seat.
A PASS STEREO switch R334 to energize the system.

RB 3. Compact Disc Reproducer - Passenger Entertainment
RB (SONY TRANSCOM 800 series)

A. General

RB The compact disc audio reproducer is designed to produce
RB stereo audio music programs from compact disc format
RB recording to the aircraft passenger entertainment
RB amplifier. The music channels are arranged to provide
RB five different stereo programs each of one hour duration.

B. Description

(1) Physical and electrical characteristics

RB The passenger entertainment compact disc reproducer is
RB in the form of a ½ ATR short rectangular case
RB including:

RB - 5 compact disc module assemblies
RB - power transformer
RB - mother board for BITE and other circuitry.

(a) Characteristics

Power supply	15 V a.c. 400 Hz single phase, 51.75W
Playtime before repeat	1 hr per compact disc
Spindle speed	200 RPM to 500 RPM
Frequency response	20-20,000 Hz, -3dBm
Harmonic distortion	Less than 0.01% at 1 kHz
Crosstalk	85 dBm minimum at 1 kHz
Dynamic range	85 dBm minimum at 1 kHz
Audio output	0 dBm voltage equivalent

(2) The compact disc reproducer includes five compact discs which can be removed via two side doors to change the music programs recorded on the discs (Ref. Fig. 001).

C. Operation

When the passenger entertainment system is energized (PASS STEREO switch in ON position), the compact disc reproducer is fed with 115 V a.c., 400 Hz signal from the passenger entertainment amplifier. This voltage is stepped down by a transformer and via circuitry to +/- 10 V.

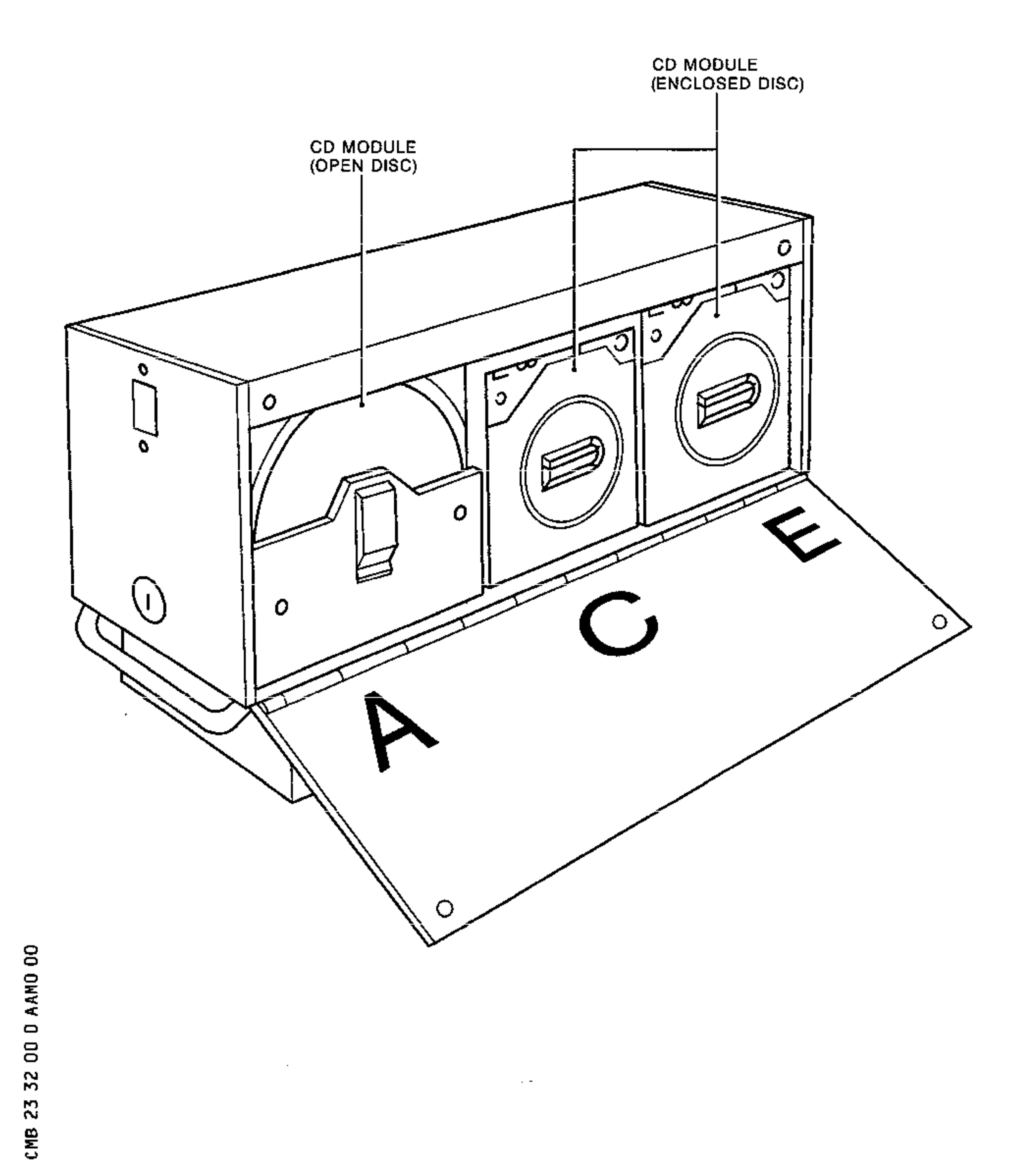
The 115 V a.c., 400 Hz voltage is also applied to one brushless motor which provides Constant Linear Velocity (CLV) of the track past the pickup and a standard motor drives the laser/lens pickup to provide tracking of the program.

The audio frequency signal is fed to the passenger entertainment amplifier, where it is amplified and then directed to all PCUs.

4. Amplifier - Passenger Entertainment (SUNDSTRAND P/N 108-020-0001)

A. General

This power amplifier is designed for use with Sony Transcom Compact Disc Reproducer. It provides the audio power amplification necessary to drive the individual PCUs. It includes five amplifier modules for amplification of the five stereo music channels which match with the music programs reproduced on the Compact Disc Reproducer.



CMB 23 32 00 0 AAM0 00

RB
RB

Audio Reproducer
Figure 001

B. Description

(1) Physical and electrical characteristics

The amplifier is in the form of a ½ ATR rectangular case including:

- an announce buffer and control circuit
- audio amplifier modules
- a 28 V d.c. filter stage
- a power control relay

(a) Characteristics

Power supply	28 + 3 to - 6 V d.c., 135 W
Frequency response	100 - 8000 Hz, + or - 3 db
Signal-to-noise ratio	45 db, referenced to 3% third harmonic distortion compact disc record level
Crosstalk	45 db minimum at 1 kHz at maximum audio level
Power output	20 W maximum adjustable into 0.6 ohm load minimum for 0 dbm input level at 28 V d.c. line.

RB

RB (2) Announce buffer and control stage (Ref. Fig.002)

This electronic stage supplied with 28 V d.c. power, provides two separate functions:

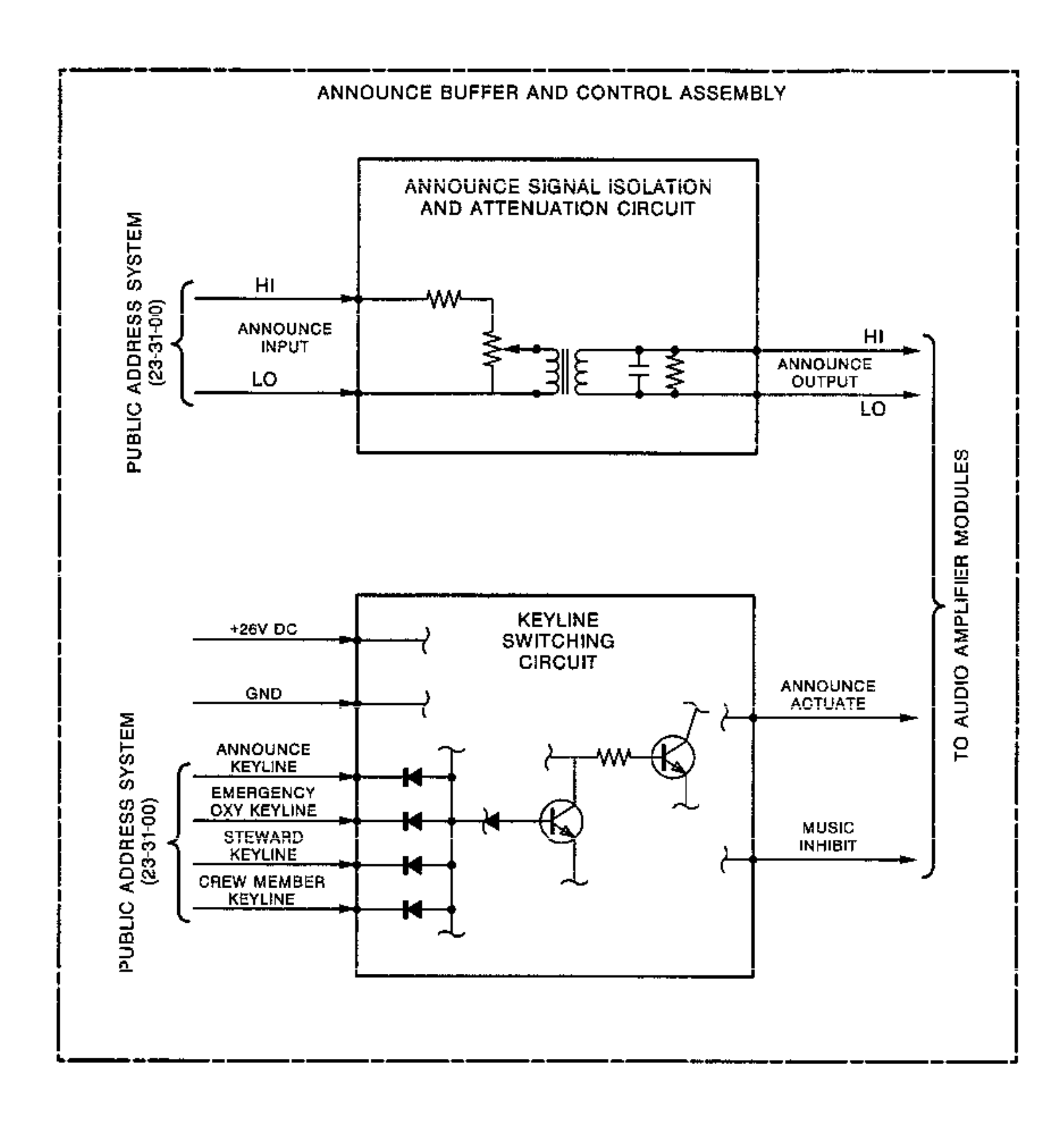
- the keyline switching circuit
- the announce signal isolation and attenuation circuit

(a) Keyline switching circuit

The function of the keyline switching circuit is to acknowledge that the STEWARD, CREW MEMBER, EMERGENCY OXY and ANNOUNCE keylines are energized. It conditions the signals to be fed to the audio amplifier modules and also switching from music to announce inputs as soon as any one of the keylines is energized by a ground.

(b) Announce signal isolation and attenuation circuit

The function of the announce signal isolation and attenuation circuit is to adjust announce signal output level. The announce signal is obtained from the Public Address system and is directly applied to a potentiometer. This potentiometer is preadjusted so as to obtain the desired audio level at the PCUs. The signal from the potentiometer is fed to the audio amplifier modules via a transformer.



CMB 23 32 00 0 ACMD 00

Announce Buffer and Control Stage - Block Diagram
Figure 002

(3) Audio amplifier modules

The electronic amplifiers distribute the power required to drive the individual PCUs. Each audio amplifier module consisting of two separate amplifiers mounted on a common heatsink, is fed with music signals from each
RB pre-amplifier in the passenger entertainment compact disc reproducer. Each module accommodates two monaural channels which can be paired to provide one stereo channel.

Announce signals are obtained from the Public Address system.

Switching between audio amplifier music and announce inputs is accomplished by keyline common input from the announce buffer and control stage.

RB C. Operation (Ref. Fig.003)

When PASS STEREO switch is placed in ON position, the power control relay is energized, thus

- applying the aircraft 28 V d.c. signal to all audio amplifier modules and to the announce buffer and control stage via a filter stage
- applying the 115 V a.c., 400 Hz signal to the passenger
RB entertainment compact disc reproducer which starts to operate.

RB The Compact Disc feeds pre-recorded music signals to the audio amplifier modules.
If the announce buffer and control stage does not receive keyline inputs, the logic enables music signals to be amplified and directed to each passenger control unit. If any one of the keylines is actuated, a ground is applied to the logic of the announce buffer and control stage thereby
RB blocking music signals from the compact disc reproducer and enabling announce signals from the Public Address system to be amplified and directed to each PCU.

5. Passenger Control Unit

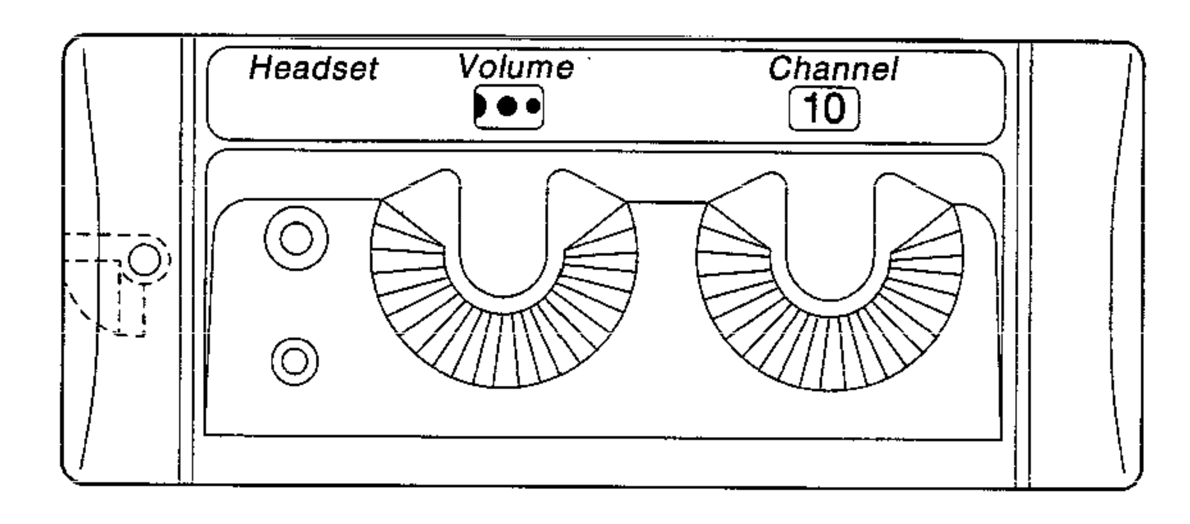
A. General

Each PCU installed in passenger seat outer armrests makes it possible for each passenger individually to select and listen to the music program of his choice by connecting
R a E-M headset to the relevant receptacles.

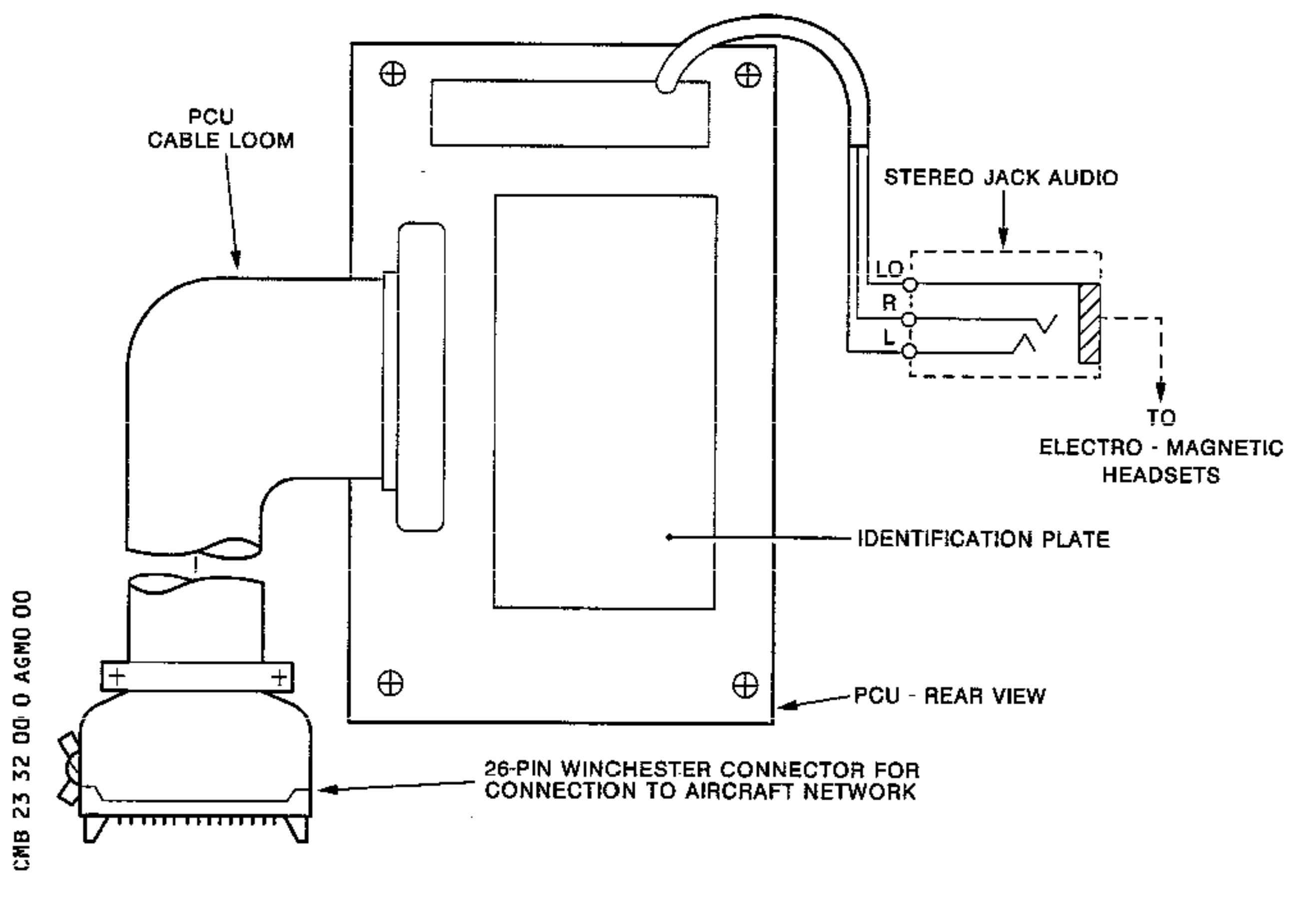
CMB 23 32 00 0 AEMO 00

RB
RB

Passenger Entertainment Amplifier - Functional Diagram
Figure 003



SEAT RIGHT HAND UNIT



RB

Passenger Control Unit - External View
Figure 004

RB B. Description (Ref. Fig. 004 and 005)

The PCU consists of:

(1) On the front face:

RB - a rotary selector numbered from 1 to 10 to select the programs
- a rotary selector to control music volume
RB - two display windows, one to display the selected program (1 to 10), the other to display the position of the volume control selector.

(2) On the rear face:

- a 26-pin connector
- a manufacturers' identification plate
B - cables to feed the audio signals to a pair of stereo headsets

(3) Inside the PCU:

- a printed circuit board
- a potentiometer with two circular tracks and two sliders for adjustment of music volume level
- a multiplex rotary selector with three sliders for music program selection.

6. Operation (Ref. Fig.006)

A. Power supply

The passenger entertainment system is supplied with:

- 28 V d.c. from main busbar A through circuit breaker R332
- 115 V a.c., 400 Hz from main busbar 1 through circuit breaker R333.

B. Operation

(1) Pre-recorded music programs

As soon as the PASS STEREO switch is placed in ON
RB position, the amplifier modules and the compact disc
RB reproducer are energized.
RB The pre-recorded music signals from the compact disc
RB reproducer are applied to the amplifier.
If no keyline is actuated, the music signals are amplified and fed to all PCUs in the passenger compartment. The passenger can select one program on his individual control unit located in the seat outer armrests and then listen to it.

P2 | J1
K | ST RT HI 1 | 1
P | ST RT HI 2 | 3
U | ST RT HI 3 | 5
A | ST RT HI 4 | 7
C | ST RT HI 5 | 9
L | ST RT LO 1 | 2
R | ST RT LO 2 | 4
V | ST RT LO 3 | 6
B | ST RT LO 4 | 8
F | ST RT LO 5 | 10
M | ST LT HI 1 | 11
S | ST LT HI 2 | 13
W | ST LT HI 3 | 15
C | ST LT HI 4 | 17
H | ST LT HI 5 | 19
N | ST LT LO 1 | 12
T | ST LT LO 2 | 14
X | ST LT LO 3 | 16
D | ST LT LO 4 | 18
J | ST LT LO 5 | 20
21
22
b | POWER | 23
a | 24
Z | GROUND | 25
Y | 26

SW1/A 4P±R O1-10
SW1/B 4P±R O1-10
SW1/C 4P±R O1-10
SW1/D 4P±R O1-10
R1 0
R2 0

RN1 / RN2 — 50K OHM MAX RESISTANCE

Resistor	Value
R15	11475
R14	8265
R13	5950
R12	4285
R11	3090
R10	2225
R9	1600
R8	1160
R7	830
R6	600
R5	430
R4	310
R3	225
R2	160
R1	116

VOLUME/RIGHT SW2/A
VOLUME/LEFT SW2/B
W1 W2 W3 W4
J2
F1 RXE025

REFERENCE ONLY
P1 J1 J2
F1 RXE025

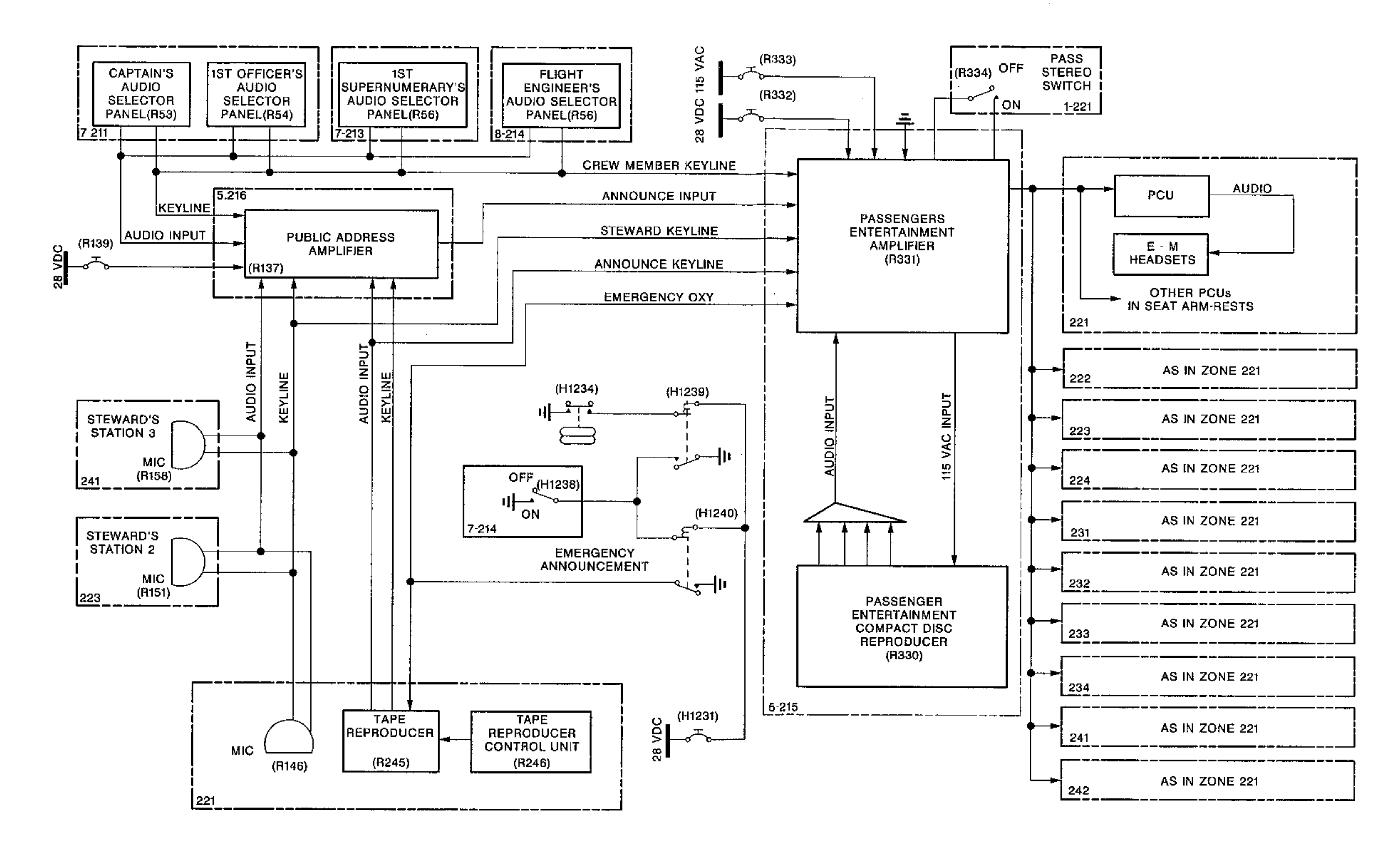
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CMB 23 32 00 0 AJM0 00

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RB
RB

PCU Schematic Diagram
Figure 005



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CMB 23 32 00 0 ALM0 00

RB
RB

Passenger Entertainment System - Block Diagram
Figure 006

(2) Priority of announcements over music programs

With the passenger entertainment system energized, the passengers can listen to the music program of their choice. The music programs are blocked and replaced automatically by an announcement as soon as one keyline is actuated:

(a) When one crew member or one Steward speaks into microphone while holding PTT switch pressed.

(b) When the Steward selects one pre-recorded announcement in the public address tape reproducer.

(c) When the emergency announcement recorded in public address tape reproducer is broadcast, following actuation of the emergency announcement circuit.

In those three cases, as soon as the keyline circuit is energized, the logic in the passenger entertainment amplifier blocks the music signals which are no longer amplified and fed, thus enabling amplification and distribution of the announcement to the passenger control units, thereby assigning a top priority of the announcements over passenger entertainment music programs.

The passenger then receives the announcement in progress. As soon as the announcement is finished, the relevant keyline being no longer energized, the music programs are heard again in the headsets.

PASSENGER ENTERTAINMENT - TROUBLE SHOOTING

CAUTION : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the passenger entertainment system to be quickly rectified.
The defects can be isolated with the aid of trouble shooting procedures (Ref. Para. 3) and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be required. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK. Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information including component location required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviciable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Boomset	B.F.E
1 E-M Headsets	B.F.E
1 Hand Microphone	B.F.E
1 Circuit Breaker Safety Clip	

RB

B. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

C. Operate electronics rack ventilation (Ref. 21-21-00).

D. On Captain's and First Officer's control column handwheels, place RAD-INT PTT switches in intermediate position.

E. On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :
- all keys on control keyboard are disengaged
- INT- R/T PTT switch is in intermediate position
- BOOM-MASK switch is in BOOM position

F. On Captain's jack panel
- connect boomset to MIC and HEADSET jacks

G. At forward Steward's station (zone 221) make certain that :
- PASS STEREO switch on panel 1-221 is in OFF position.
- VOLUME-OFF control on tape reproducer control unit is in OFF position.

H. On Flight Engineer's panel 7-214, make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

J. At one Steward's station (zone 221, 223, 241) make certain that aircraft hand microphone is in place.

K. Make certain that the following circuit breakers are set.

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH. SUP.	1-213	R 89	K19
PA. SUP.		R 139	K20
EMER PASS OXY CONT & IND		H1231	C11
TAPE REPRO. DC. SUP		R 248	L19
TAPE REPRO. AC. SUP	2-213	R 247	G21
No.2 INPH. SUP.	3-213	R 90	H 2
PASS ENT. DC. SUP.	15-215	R 332	G18
PASS ENT. AC. SUP	14-215	R 333	B 4

L. Trip, safety and tag EMER PASS OXY CONT circuit breaker H1232 on panel 1-213 (Map Ref. C10).

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3. Trouble Shooting

```
***************************************************
* Check reception of passenger entertainment music  *
* programs.                                          *
*                                                    *
* 1. At forward Steward's station (zone 221), on     *
*    panel 1-221, place PASS STEREO switch [1] in ON*
*    position.                                       *
*                                                    *
* 2. On the PCU in each passenger seat arm-rest,     *
*    using program selector, check that :            *
*    - for each program selected, the music is heard*
*      at the headsets.                              *  RB
*                                                    *
* 3. On each PCU, turn volume control selector :     *
*    - the audio level must vary at the headsets.    *  RB
*                                              If.   *  RB
***************************************************
   ||      |
   ||      |    ------------------------------------------------
   ||      |   | None of the selected programs is received at   |
   OK      NOT OK---| all PCUs. Ref. Chart 101.                 |
   ||      |    ------------------------------------------------
   ||      |    ------------------------------------------------
   ||      |   | No reception of the same program selected at   |
   OK      NOT OK---| all PCUs. Ref. Chart 102.                 |
   ||      |    ------------------------------------------------
   ||      |    ------------------------------------------------
   ||      |   | At one PCU, no reception of one or all programs|
   OK      NOT OK---| selected. Replace faulty PCU.             |
   ||      |    ------------------------------------------------
   ||      |    ------------------------------------------------
   ||      |   | At one PCU, the audio level does not vary when |
   OK      NOT OK---| the volume control selector is rotated.   |
   ||          | Replace faulty PCU.                            |
   ||           ------------------------------------------------
   ||
   ||
```

```
       ||
       ||
 ***************************************************
 * Priority of announcements made by the crew members*
 *                                                   *
 * 1. At one passenger seat, on PCU, select a program*
B *    and check reception at the headsets.           *
 *                                                   *
 * 2. On Captain's audio selector panel, engage PA   *
 *    key on keyboard.                               *
 *                                                   *
 * 3. Place and hold RAD-INT PTT switch on Captain's *
 *    control column handwheel in RAD position and   *
 *    speak into boomset microphone.                 *
 *    - the announcement is broadcast at passenger   *
 *      compartment loudspeakers                     *
 *    - the music program in progress is interrupted *
B *      by the announcement at the PCU headsets.     *
RB *                                         If.      *
 ***************************************************
       ||       |
       ||       |     | The announcement is broadcast at passenger   |
       OK      NOT OK---| compartment loudspeakers without interrupting |
B      ||       |     | the music program at PCU headsets.           |
       ||       |     | Replace amplifier [4].                       |
       ||       |
       ||       |     | The announcement does not replace the music  |
B      ||       |     | program at PCU E-M headsets and is not       |
       OK      NOT OK---| broadcast at passenger compartment loudspeakers|
       ||             | Ref. 23-31-00, Trouble Shooting.             |
       ||
       ||
 ***************************************************
 * Priority of announcements made by the Stewards    *
 *                                                   *
 * 1. At one passenger seat, on PCU, select a program*
B *    and check reception at the headsets.           *
 *                                                   *
 * 2. At one Steward's station, speak into microphone*
 *    while holding PTT switch pressed.              *
 *    - Steward's announcement is broadcast at pass- *
 *      enger compartment loudspeakers               *
 *    - the music program in progress is interrupted *
B *      by the announcement at the PCU headsets.     *
B *                                         If.      *
 ***************************************************
       ||       |
```

```
         ||       |
         ||       |
         ||       |    ------------------------------------------------
         ||       |   | The announcement is broadcast at passenger     |
         OK     NOT OK---| compartment loudspeakers without interrupting |
RB       ||       |   | the music program at PCU headsets.             |
         ||       |   | Replace amplifier [4].                          |
         ||       |    ------------------------------------------------
         ||       |    ------------------------------------------------
         ||       |   | The announcement does not replace the music    |
RB       ||       |   | program at PCU E-M headsets and is not         |
         OK     NOT OK---| broadcast at passenger compartment loudspeakers|
         ||           | Ref. 23-31-00, Trouble Shooting.               |
         ||            ------------------------------------------------
         ||
         ||
      *****************************************************
      * Priority of announcements pre-recorded on public  *
      * address tape reproducer.                          *
      *                                                   *
      * 1. At one passenger seat, on PCU, select a program*
RB    *    and check reception at the headsets.           *
      *                                                   *
      * 2. On control unit of public address tape repro-  *
      *    ducer located at forward Steward's station     *
      *    (zone 221), press one of the push-button num-  *
      *    bered from 2 to 12.                            *
      *    - on control unit, WAIT caption light corres-  *
      *      ponding with selected push-button illuminates*
      *    - the announcement is broadcast in passenger   *
      *      compartment loudspeakers                     *
      *    - the music program in progress is interrupted *
RB    *      by the announcement at the PCU headsets.     *
RB    *                                          If.      *
      *****************************************************
         ||       |
         ||       |    ------------------------------------------------
         ||       |   | The announcement is broadcast at passenger     |
         ||       |   | compartment loudspeakers without interrupting  |
RB       OK     NOT OK---| the music program at PCU headsets.          |
         ||       |   | Replace amplifier [4].                          |
         ||       |    ------------------------------------------------
         ||       |
         ||       |    ------------------------------------------------
         ||       |   | The announcement does not replace the music    |
RB       ||       |   | program at PCU E-M headsets and is not         |
         OK     NOT OK---| broadcast at passenger compartment loudspeakers|
         ||           | Ref. 23-31-00, Trouble Shooting.               |
         ||            ------------------------------------------------
         ||
R        ||
```

```
R       ||
     *****************************************************
     * Priority of emergency announcement pre-recorded on*
     * public address tape reproducer                    *
     *                                                   *
     * 1. On panel 1-213, make certain that EMER PASS OXY*
     *    CONT circuit breaker (Map Ref. C10) is tripped,*
     *    safetied and tagged.                           *
     *                                                   *
     * 2. At one passenger seat, on PCU, select a program*
RB   *    and check reception at the headsets.           *
     *                                                   *
     * 3. On Flight Engineer's panel 7-214, place PASS-  *
     *    ENGER SYSTEM EMERG MANUAL O/RIDE switch in ON  *
     *    position                                       *
     *    - the emergency announcement is broadcast at   *
     *      passenger compartment loudspeakers           *
     *    - the music program in progress is interrupted *
     *      by the emergency announcement at the PCU     *
RB   *      headsets.                                    *
     *****************************************************
        ||     |
        ||     |      -----------------------------------------------------
        ||     |      | The emergency announcement is broadcast at       |
        ||     |      | passenger compartment loudspeakers without       |
RB      OK     NOT OK---| interrupting the music program at PCU E-M    |
RB      ||     |      | headsets. Replace amplifier [4].                 |
        ||     |      -----------------------------------------------------
        ||     |
        ||     |      -----------------------------------------------------
        ||     |      | The emergency announcement does not replace the|
RB      ||     |      | music program at PCU E-M headsets and            |
        OK     NOT OK---| is not broadcast at passenger compartment loud-|
        ||            | speakers. Ref. 23-31-00, Trouble Shooting        |
        ||            -----------------------------------------------------
        ||
        ||
     *****************************************************
     * The passenger entertainment system is serviceable *
     *****************************************************
```

NONE OF THE SELECTED PROGRAMS IS RECEIVED AT ALL PCUS.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

Check 28VDC supply at circuit breaker [2] and 115VAC supply at circuit breaker [3]

- NOT OK → Replace faulty circuit breaker [2] and/or [3]
- OK → Check continuity between terminals 1 and 2 of switch [1]
  - NOT OK → Replace switch [1].
  - OK → Replace amplifier [4]
    - NOT OK → Replace compact disc reproducer [5].
      - NOT OK → Check wiring. Refer to WDM 23-32-01, 23-32-11, 23-32-12

RB

Chart 101

```
**************************************
* NO RECEPTION OF THE SAME PROGRAM   *
* SELECTED AT ALL PCUS.              *
**************************************

**************************************
* Replace amplifier [4].             *
**************************************
                  |
               NOT OK
                  |
    --------------------------------------
RB  | Replace compact disc reproducer    |
    | [5].                               |
    --------------------------------------
```

Chart 102

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF	
					MAINT. TOPIC	WIRING DIAGRAM
[1] PASS STEREO Switch		1-221	R334	Fwd Stewards' station	33-20-00 R/I	23-32-11 23-32-01
[2] Circuit Breaker, 28VDC		15 215	R332	Map Ref. G18	24-50-00 R/I	23-32-11 23-32-01
[3] Circuit Breaker, 115VAC		14-215	R333	Map Ref. B4	24-50-00 R/I	23-32-11 23-32-01
[4] Passenger Entertainment Amplifier		5-215	R331	LH Electronics rack	23-32-31 R/I	23-32-11 23-32-12 23-32-01
[5] Passenger Entertainment RB Compact RB Disc Reproducer		5-215	R330	LH electronics rack	23-32-32 R/I	23-32-11 23-32-01

Component Identification
Table 101

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[1] PASS STEREO Switch		1-221	R334	Fwd Steward's station	33-20-00 R/I	23-32-11 23-32-01
[2] Circuit Breaker, 28VDC		15-215	R332	Map Ref. G18	24-50-00 R/I	23-32-11 23-32-01
[3] Circuit Breaker, 115VAC		14-215	R333	Map Ref. B4	24-50-00 R/I	23-32-11 23-32-01
[4] Passenger Entertain-ment Ampli-fier		5-215	R331	LH Elec-tronics rack	23-32-31 R/I	23-32-11 23-32-12 23-32-01
[5] Passenger Entertain-ment Tape Reproducer		5-215	R330	LH elec-tronics rack	23-32-32 R/I	23-32-11 23-32-01

Component Identification
Table 101

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Boomset	B.F.E.
RB 1 E-M Headsets	B.F.E.

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) On Captain's and First Officer's control column hand-wheels, place RAD-INT PTT switches in intermediate position.

(4) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :
- all keys on control keyboard are disengaged.
- the INT-R/T PTT switch is in intermediate position.
- the BOOM-MASK selector switch is in BOOM position.

(5) On Captain's jack panel :
- connect a boomset to the relevant HEADSET and MIC jacks.

(6) At forward Steward's station (Zone 221) make certain that :
- PASS STEREO switch, on panel 1-221, is placed in OFF position.
- on Public Address Tape Reproducer control unit, the VOLUME/OFF switch is in OFF position.

(7) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
PA SUP		R 139	K20
No.2 INPH SUP	3-213	R 90	H 2
PASS ENT DC SUP	15-215	R 332	G18
PASS ENT AC SUP	14-215	R 333	B 4

C. Tests

(1) Passenger Entertainment Music Broadcasting

(a) At forward Steward's station (zone 221) on panel 1-221, place PASS STEREO switch in ON position
- at one of the Passenger Control Units (PCU) installed in the armrest of each passenger seat in the cabin, select a programme and make certain that :

RB RB - music is correctly heard in the headsets.

- selection of the various programme channels operates correctly.
- the audio volume control operates correctly.

(2) Priority of announcements over Passenger Entertainment music.

RB RB (a) On a passenger seat PCU, select a programme and make certain that it is well heard in the E-M headsets.

(b) On Captain's audio selector panel, engage PA key on keyboard.

(c) Place and hold RAD-INT PTT switch on Captain's control column handwheel, in RAD position and speak into boomset microphone :

RB - in the passenger PCU E-M headsets, the music programme which was selected is interrupted by the announcement made in the flight compartment.

(d) Release RAD-INT PTT switch on Captain's control

column handwheel :
RB - in the passenger PCU E-M headsets, the music programme is resumed.

D. Close-Up

(1) At forward Steward's station (zone 221) on panel 1-221, place PASS STEREO switch in OFF position.

(2) On Captain's jack panel, disconnect boomset from MIC and HEADSET jacks.

(3) On Captain's audio selector panel disengage PA key on keyboard.

RB (4) On passenger PCU, disconnect E-M Headsets

(5) Stop electronics rack ventilation (Ref. 21-21-00).

(6) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Boomset	B.F.E.
RB 1 E-M headsets.	B.F.E.
1 Hand Microphone	B.F.E.
1 Circuit Breaker Safety Clip	

B. Prepare

(1) Connect electrical ground power unit, and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(2) Operate electronics rack ventilation (Ref. 21-21-00).

(3) On Captain's and First Officer's control column hand-wheels, place RAD-INT PTT switches in intermediate position.

(4) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :
- all keys on control keyboard are disengaged.
- the INT-R/T PTT switch is in intermediate position.
- the BOOM-MASK selector switch is in BOOM position.

(5) On Captain's jack panel :
- connect a boomset to the relevant MIC and HEADSET jacks.

(6) At one Steward's station, (zones 221, 223, 241) make certain that the aircraft hand microphone is in place.

(7) On Flight Engineer's panel (7-214), make certain that PASSENGER SYSTEM EMERG MANUAL O/RIDE switch is in OFF position.

(8) At forward Steward's station (zone 221), make certain that :
- PASS STEREO switch is in OFF position.
- on the tape reproducer control unit, the VOLUME/OFF switch is in OFF position.

(9) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
PA SUP		R 139	K20
EMER PASS OXY IND		H1231	C11
TAPE REPRO DC SUP		R 248	L19
TAPE REPRO AC SUP	2-213	R 247	G21
No.2 INPH SUP	3-213	R 90	H 2
PASS ENT DC SUP	15-215	R 332	G18
PASS ENT AC SUP	14-215	R 333	B 4

(10) Trip, safety and tag circuit breaker EMER PASS OXY CONT H1232 on panel 1-213, map Ref. C10.

C. Tests

(1) Passenger Entertainment Music Broadcasting

(a) At forward Steward's station (zone 221) on panel 1-221, place PASS STEREO switch in ON position.
- at the Passenger Control Units (PCU) installed in the armrest of each passenger seat in the cabin, select a programme and make certain that :
RB - music is correctly heard in the headsets.
RB
- selection of the various programme channels operates correctly
- the audio volume control operates correctly.

(2) Priority of Crew Announcements

(a) On a passenger seat PCU, select a programme and
RB make certain that it is well heard in the E-M
RB headsets.

(b) On Captain's audio selector panel, engage PA key on keyboard.

(c) Place and hold RAD-INT PTT switch on Captain's control column handwheel, in RAD position and

speak into boomset microphone :
RB - in the passenger PCU E-M headsets, the music programme which was selected is interrupted by the announcement made in the flight compartment.

(d) Release RAD-INT PTT switch on Captain's control column handwheel :
RB - in the passenger PCU E-M headsets, the music programme is resumed.

(3) Priority of Steward's Announcements

(a) At one of the Steward's stations, press the hand microphone PTT switch, speak into the microphone and make certain that :
RB - in the passenger PCU E-M headsets, the music programme which was selected is interrupted by the announcement made at the Steward's station.

(b) Release the Steward's microphone PTT switch :
RB - in the passenger PCU E-M headsets, the music programme is resumed.

(4) Priority of Announcements Pre-Recorded on the Public Address Tape Reproducer

(a) On the Public Address tape reproducer control unit located at the forward Steward's station (zone 221) :
- press one of the push-buttons numbered from 2 to 12 :
  - on the control unit, the WAIT caption light associated to the selected push-button illuminates.
RB - in the passenger PCU E-M headsets, the music programme which was selected is interrupted by the announcement..

(b) When the announcement is finished, the music programme is broadcast again in the passenger
RB PCU E-M headsets.

(5) Priority of Emergency Announcement Pre-recorded on the Public Address Tape Reproducer

(a) On panel 1-213, make certain that circuit breaker H1232 (map Ref. C10) is tripped, safetied and tagged.

(b) On panel 7-214, on Flight Engineer's console, place PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in ON position :
RB - in the passenger PCU E-M headsets, the music programme is interrupted by the emergency announcement.

(c) On the Flight Engineer's console, place the PASSENGER SYSTEM EMERG MANUAL O/RIDE switch in OFF position :
RB - in the E-M headsets, the music programme is broadcast again as soon as the emergency announcement is finished.

D. Close-Up

(1) At forward Steward's station, on panel 1-221, place PASS STEREO switch in OFF position.

(2) On Captain's jack panel, disconnect boomset from MIC and HEADSET jacks.

(3) On Captain's audio selector panel, disengage PA key on keyboard.

RB (4) Disconnect E-M headsets from the passenger PCU.

(5) Remove safety clip and reset EMER PASS OXY CONT circuit breaker H1232 on panel 1-213, map Ref. C10.

(6) Stop electronics rack ventilation (Ref. 21-21-00).

(7) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

3. System Test

Identical to Functional Test, refer to Paragraph 2.

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PASSENGER ENTERTAINMENT AMPLIFIER - REMOVAL/INSTALLATION

1. General

The passenger entertainment amplifier (R331) is installed in LH electronics rack, on shelf 5-215.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	-
Blanking Plugs/Caps (electrical connectors)	-
Blanking Plate (to cover ventilation outlet)	-

B. Prepare

(1) At Forward Stewards' station (in zone 221), on panel 1-221, make certain that:
RB - PASS STEREO switch is in OFF position

RB **ON A/C 007-007

RB - COMPACT DISC REPRODUCER switch is in OFF position.

(2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PA SUP	1-213	R139	K20
PASS ENT AC. SUP	14-215	R333	B 4
PASS ENT DC. SUP	15-215	R332	G18

(3) On LH electronics rack, remove panel 215ES to gain access to shelf 5-215.

C. Remove

Refer to 23-00-00, Removal/Installation, Paragraph 2.D.

D. Preparation of Replacement Component

Refer to 23-00-00, Removal/Installation, Paragraph 2.E.

E. Install

Refer to 23-00-00, Removal/Installation, Paragraph 2.F.

F. Test

(1) Remove safety clips and tags and reset circuit breakers previously tripped in paragraph 2.B.(2).

(2) Carry out an operational test of passenger entertainment system (Ref. 23-32-00, Adjustment/Test, paragraph 1).

G. Close-Up

(1) Install panel 215ES on LH electronics rack.

RB PASSENGER ENTERTAINMENT COMPACT DISC REPRODUCER - REMOVAL/INSTALLATION

1. General

RB The passenger entertainment Compact Discs are installed in the
RB five Compact Disc modules in the Compact Disc Reproducer in LH
RB electronics rack, on shelf 5-215.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	-
Blanking Plugs/Caps (Electrical Connectors)	-
Blanking Plate (to Cover Ventilation Outlet)	-
RB Compact Discs (the Correct Discs for the Relevant Month)	-

B. Prepare

(1) At Forward Stewards' station (in zone 221), on panel 1-221, make certain that:

- PASS STEREO switch is in OFF position

RB **ON A/C 007-007

RB - COMPACT DISC REPRODUCER switch is in OFF position.

(2) Trip, safety and tag the following circuit breakers:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
PA SUP	1-213	R139	K20
PASS ENT AC. SUP	14-215	R333	B 4
PASS ENT DC. SUP	15-215	R332	G18

(3) On LH electronics rack, remove panel 215ES to gain access to shelf 5-215.

RB C. Remove Compact Disc Reproducer

(1) Refer to 23-00-00, Removal/Installation, Paragraph 2.D.

RB D. Remove Compact Discs

RB (1) Turn the four screws on the side of the unit in a
RB counter clockwise direction so that the two side doors
RB open downwards.

RB (2) Press the eject buttons on the five compact disc
RB modules and remove the compact discs.

RB E. Install Compact Discs

RB (1) Install the new compact discs for the correct month
RB in the correct slots (e.g. 'A' disc in slot 'A')
RB ensuring:

RB (a) The printed sides face outwards.

RB (b) The handling of the compact disc is carried out in
RB a completely clean environment.

RB (2) Close the doors on the compact disc modules and then
RB close the two side doors on the unit turning the four
RB screws in a clockwise direction to lock the doors in
RB place.

RB (3) Ensure that all the compact discs are returned to
RB stores. They are NOT disposable items.

RB F. Preparation of Replacement Component

Refer to 23-00-00, Removal/Installation, Paragraph 2.E.

RB G. Install

Refer to 23-00-00, Removal/Installation, Paragraph 2.F.

RB H. Test

(1) Remove safety clips and tags and reset circuit breakers previously tripped in paragraph 2.B.(2).

(2) Carry out an operational test of passenger entertainment system (Ref. 23-32-00, Adjustment/Test, Paragraph 1).

RB I. Close-Up

(1) Install panel 215ES on LH electronics rack.

INTERPHONE - DESCRIPTION AND OPERATION

1. General

The interphone system includes:

- the interphone system
- the ground call system

2. Description and Operation

A. Interphone

The interphone system provides the means of communication between crew members. It also integrates in the audio selector panels all means of reception and modulation. A selective procedure allows to use one or several mixed reception channels and to modulate microphones or internal communication circuit.

B. Ground Call System

The ground call system provides visual means (to crew members and ground personnel) and aural means (to ground personnel) for signalling that either crew members or ground personnel are wishing to establish a communication.

INTERPHONE - DESCRIPTION AND OPERATION

1. General

The interphone system provides the crew members with :

- Voice communication with other aircraft or ground radio stations, via the HF and VHF receivers
- Reception of MARKER-VOR-ILS-DME-ADF navigation signals
- Voice communication between all crew members
- Communication between crew members and Stewards
- Transmission of announcements, through the public address system
- Communication with the ground service personnel, via ground service jacks, when the aircraft is on the ground
- Connection with the cockpit voice recorder
- Connection with the audio warning system.
- Connection with the flight recorder.

(Ref. Fig. 001)

2. System Components

The interphone system main components are :

- Four audio selector panels (R53, R54, R55, R56)
- Five jack panels (R57, R58, R59, R60, R93)
- One interphone amplifier (R62)
- Three Steward station telephone handsets (R99, R100, R101)
- Eighteen ground service jacks (R73 to R80, R95 and R96)
- One NORMAL-CABIN switch

B - Astrolite headset PN/ 5312/BM to all crew positions (CM42050)

3. Interphone Amplifier - TEAM EA 1303C-2

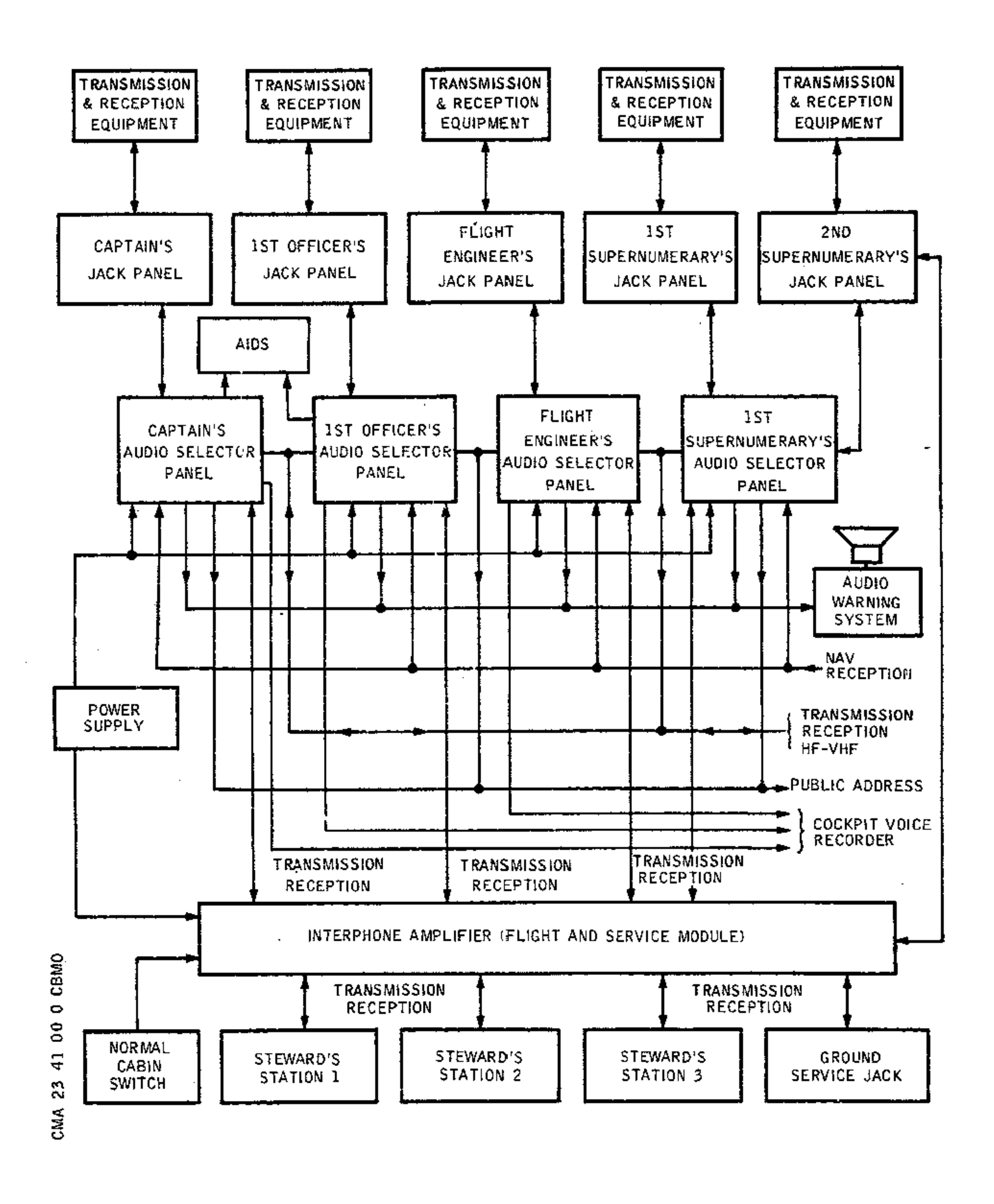
A. Description

(1) Mechanical characteristics

The amplifier is a 1/4 ATR rectangular case weighing case weighing 1.370 Kg (3lb.)

(a) The front face includes :
- A carrying handle
- A locking tab for securing equipment to mounting

(b) On the rear face is a connector which provides connection of the amplifier to the aircraft electrical network.



Interphone - Block Diagram
Figure 001

R EFFECTIVITY: ALL

BA

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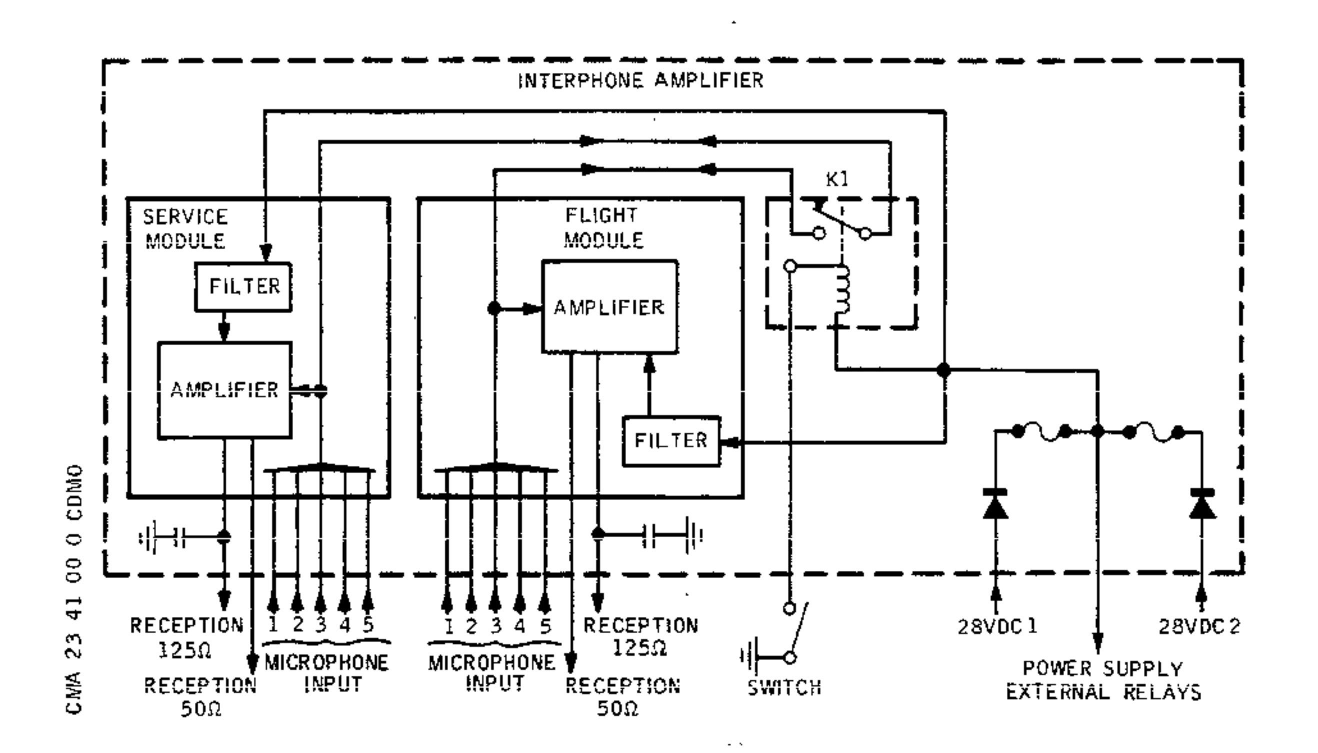
(2) Electrical Characteristics

The interphone amplifier is entirely transistorized. It is supplied by two separate +28VDC lines coupled by diodes and protected by two fuses. The interphone amplifier amplifies.

(a) The signals from the flight interphone module and from the service interphone module.
Each of these modules has :
- one microphone input of 0.25V/150 ohms, (isolated from the ground) on five separate channels.
- two reception outputs of 50 and 125 ohms impedance, the last one being disconnected by a capacitor.

NOTE : Upon customer's request, the two interphone modules may be connected in parall, by means of a relay.

B. Operation (Ref. Fig. 002)



Interphone Amplifier : Block Diagram
Figure 002

The interphone amplifier is power supplied by two separate +28 V d.c. lines coupled by diodes and protected by fuses in order to avoid complete loss of radio and interphone communications if the common supply is accidently grounded.
The power supply is fed
- to FLIGHT and SERVICE interphone module filters
- to a relay external to the amplifier.

(1) FLIGHT and SERVICE interphone modules

Both FLIGHT and SERVICE interphone modules are strictly identical.
The five microphone inputs are applied to the amplifier. After being amplified, the audio frequency signal is fed to one 50 ohms and one 125 ohms impedance reception circuit. The 125 ohms output is disconnected through a capacitor to avoid any pickup of HF signal when using a headset with a long cable at nose gear interphone box.
In case of failure of either one of the interphone modules, relay K1 connects in parallel the faulty module input with the other module input. The relay control is installed on customer's request only.
Through use of a switch located in flight compartment, a ground signal is fed to one terminal of relay coil while the other terminal is fed with a +28 V d.c. signal.

R **ON A/C 001-006

4. Audio Selector Panel - GABLES G3836

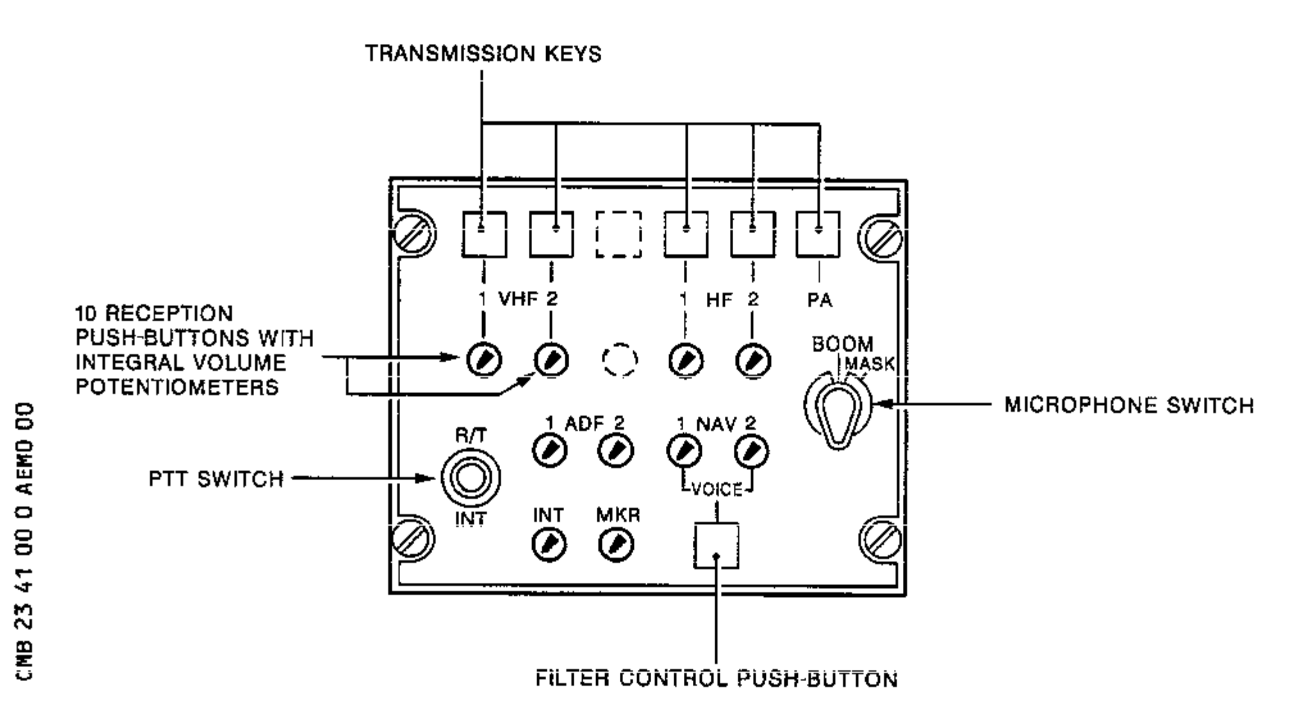
A. Description (Ref. Fig. 003)

(1) Mechnical characteristics

The audio selector panel is rectangular.

(a) On the front are located:

(a1) A keyboard, with 5 keys marked VHF1, VHF2, HF1, HF2, PA and a sixth key available for another function.
The first four keys are used for selecting radio transmissions.
The fifth key is used for public address.
The sixth key is used for voice communication.
Only one key may be engaged at one time, engaging a key results in automatically disengaging the key previously engaged. When engaged, the keys illuminate.



Audio Selector Panel: Front Face View
Figure 003

(a2) Ten push-buttons, each with an integral volume potentiometer, marked VHF1, VHF2, HF1, HF2, ADF1, ADF2, NAV1, NAV2, INT, MKR and an eleventh one, available for another function. When engaged, each of these independent push-buttons provides the selection of one definite reception channel and the relevant volume control by means of the integral potentiometer. Reception mixing is possible. When engaged the push-buttons illuminate.

(a3) One three-position INT-R/T push-to-talk switch

- In the INT, or conference function, the PTT switch remains engaged in the absence of any further action.
- In the intermediate position, it allows using all PTT switches. It remains in this position in the absence of any further action.
- In the R/T position, the PTT switch must be manually maintained for the whole duration of the transmission. When released, it automatically switches back to the intermediate position.

(a4) One VOICE push-button which, when engaged, connects a filter for reception of navigation channels, in order to facilitate understanding of radio messages received on VOR-ILS-DME channels.
When engaged, this push-button illuminates.

(a5) One BOOM-MASK switch which allows using either one of the relevant microphones.

(b) On the rear panel are two connectors which provide connection of the audio selector panel to the aircraft electrical network.

(2) Electrical characteristics

The audio selector panel is provided with push-buttons, potentiometers, switches, one amplifier, one filter and relays.
The reception circuit includes two amplifiers, and a third amplifier allows increasing sound level of the communication from boomset or mask microphones.
Power supply : 28 V d.c.
Lighting : 5 V a.c. - 400 Hz

B. Operation

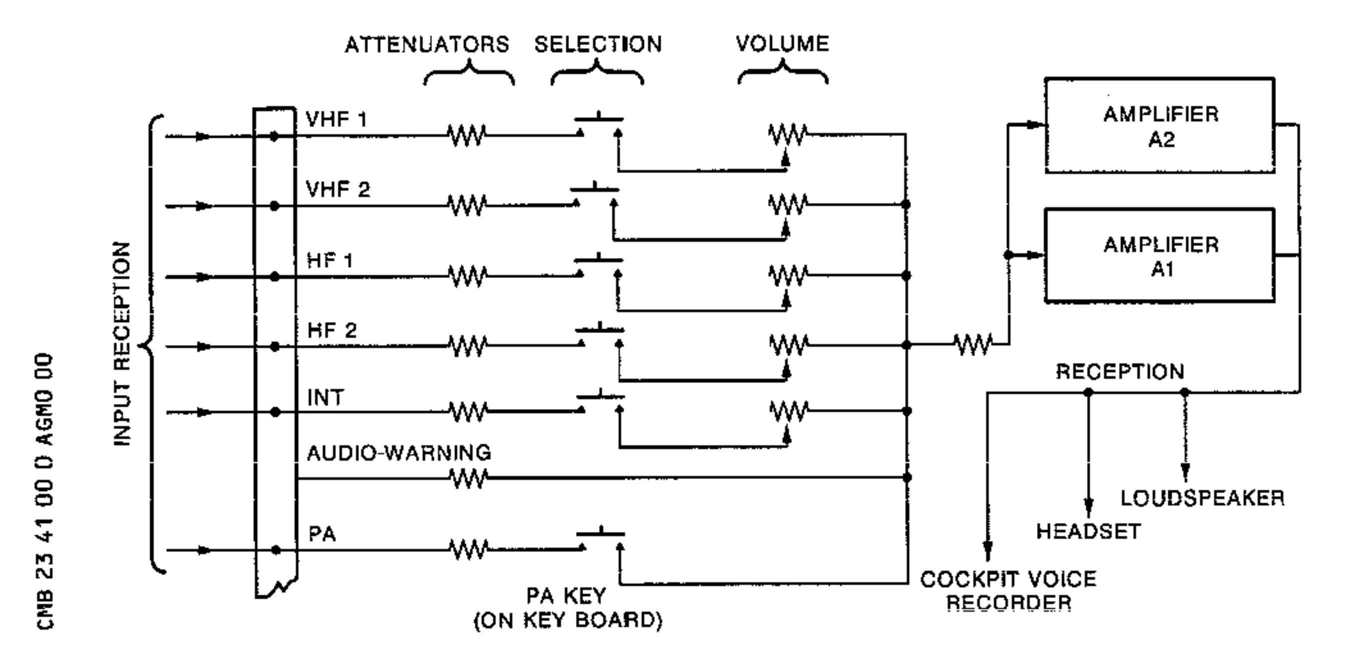
(1) Reception (Ref. Fig. 004 and 005)

(a) Communication channels

Audio frequency signals from:

- The receivers (VHF1, VHF2, HF1, HF2 pushbuttons)
- The interphone amplifier (INT push-button)
- The public address amplifier (PA key on keyboard engaged)

are applied to their respective attenuation resistors.
According to channel selected, the audio frequency signal is fed to the reception amplifier, after its volume has been adjusted by means of the integral volume potentiometer (VHF1, VHF2, HF1, HF2 and INT), and then supplied to reception amplifiers A1 and A2. Only the public address signal will not be submitted to volume control, as there is no relevant volume potentiometer.



Audio Selector Panel:
Reception of Communication Channels
Figure 004

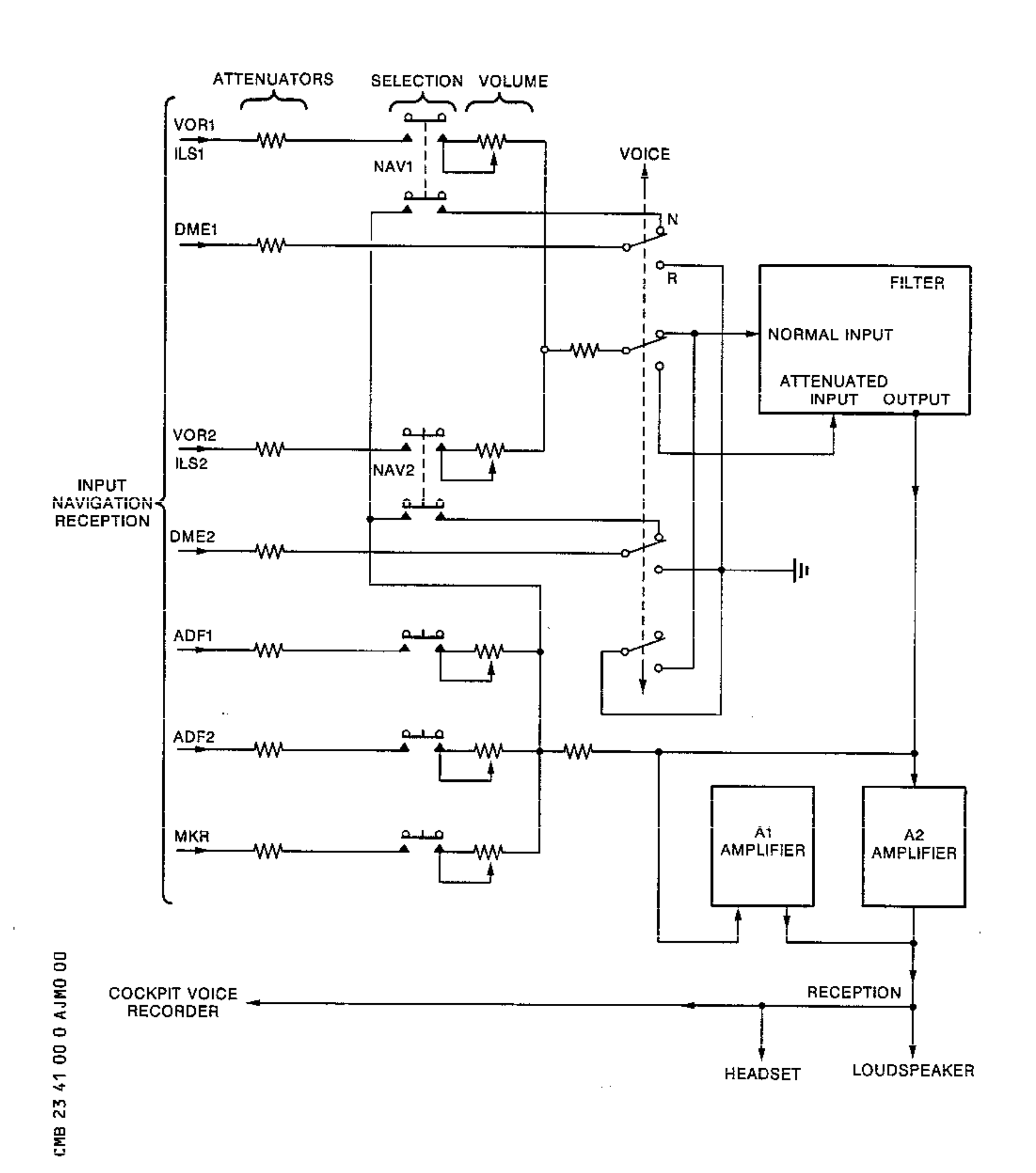
After being amplified, the signal is applied to:

- The cockpit voice recorder circuit,
- The headset circuit,
- The loudspeaker circuit.

(b) Navigation channels

Audio frequency signals from the VOR, ILS, DME, ADF, MARKER navigation receivers are directly applied to their respective attenuation resistor. According to channel selected, the signals are applied as follows, after their volume has been adjusted by means of the integral volume potentiometer:

- MARKER, ADF1, ADF2 signals are directly applied to amplifiers A1 and A2, by pressing the corresponding push-button (MRK, ADF1, ADF2).



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Audio Selector Panel: Reception of Navigation Channels
Figure 005

- DME1 or DME2 signals are directly applied to amplifiers A1 and A2, through the "N" contacts of the VOICE push-button, and by pressing NAV1 or NAV2 push-buttons.
- VOR1 or ILS1, VOR2 or ILS2 signals are applied to VOICE push-button when NAV1 or NAV2 push-button is pressed.

If the VOICE push-button is not pressed (N position):

- VOR and ILS signals are applied to the normal input of the filter and from the filter output, to amplifiers A1 and A2.

If VOICE push-button is pressed (R position):

- VOR and ILS signals are applied to the attenuated input of the filter and, from the filter output, to amplifiers A1 and A2,
- DME1 and DME2 reception inputs and the normal input of the filter are connected to the ground.

After being amplified, the selected signal(s) is supplied to:

- The cockpit voice recorder circuit,
- The headset circuit,
- The loudspeaker circuit.

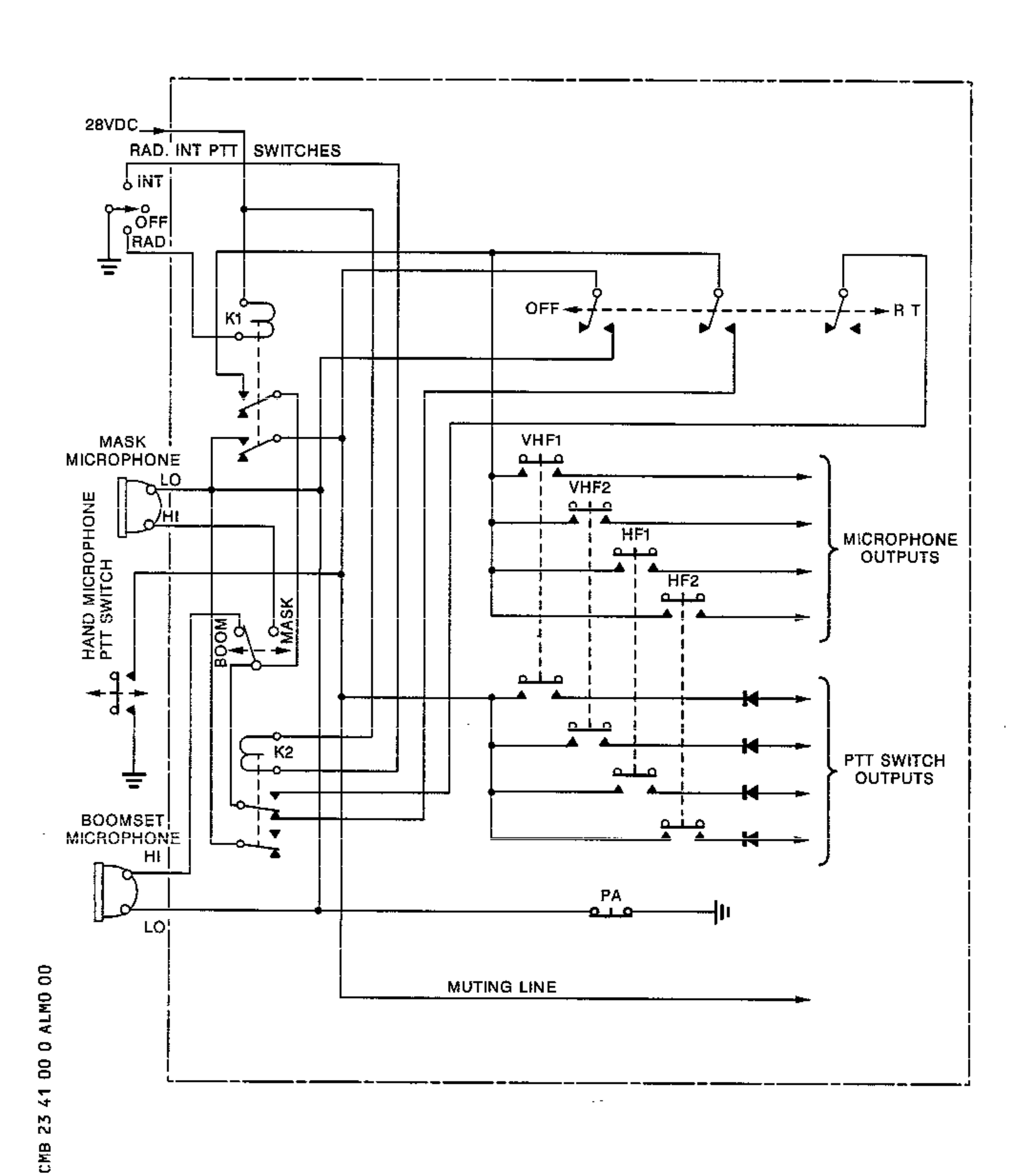
(2) Voice Communication

(a) Voice Communication via VHF and HF transmitters (Ref. Fig. 006)

(a1) Voice communication through hand microphone

With the RAD-INT PTT switch in the intermediate (OFF) position, relays K1 and K2 are de-energized.
The R/T-INT PTT switch on the audio selector panel is placed in the intermediate (OFF) position.
With the hand microphone pressed and held, the following circuits are connected to the ground:

- the PTT switch circuit, through the keyboard contacts corresponding to the selected transmitter and its diode.
- the loudspeaker MUTING line, through a diode.



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Audio Selector Panel: Voice Communication via VHF and HF Transmitter
Figure 006

The HI signal from the hand microphone is directly applied to the output circuit through the keyboard contacts corresponding to the selected transmitter.
The LO signal from the hand micrphone is obtained via a ground connection through a contact of the PA key (PA key disengaged).

(a2) Voice Communication through mask microphone and external PTT switch

The hand microphone push-to-talk switch is released and, therefore, made inoperative.
The audio selector panel PTT switch is in the intermediate (OFF) position.
The BOOM-MASK switch on the audio selector panel is in the MASK position.
The RAD-OFF-INT external PTT switch is placed and held in the RAD position, thus connecting relay K1 to the ground: K1 is energized, K2 is de-energized.
The HI signal from the mask microphone is applied to a contact of relay K1 to the microphone output circuit, through the BOOM-MASK switch and the keyboard contacts corresponding to the selected transmitter.
The LO signal from the mask microphone is obtained by means of a ground connection through a contact of the PA key (PA key disengaged) and a contact of relay K1 (K1 energized). This signal is applied to:

- the PTT switch output circuit, through the keyboard contacts corresponding to the selected transmitter and through its diode,
- the loudspeaker MUTING line, through a diode.

(a3) Voice Communication through mask microphone and audio selector panel PTT switch

The RAD-INT external PTT switch is released and therefore is in the intermediate position, thus de-energizing relays K1 and K2. The BOOM-MASK switch is placed in the MASK position.
The R/T-INT PTT switch on the audio selector panel is placed and held in the R/T position.
The HI signal from the mask microphone is applied to a contact of relay K2 (K2 de-energized), through the BOOM-MASK switch,

and then fed to a contact of the OFF-R/T PTT switch and the microphone output circuit, through the keyboard contacts corresponding to the selected transmitter.
The LO signal from the mask microphone is obtained by means of a ground connection through a contact of the OFF-R/T PTT switch and fed to:

- the output circuit of the PTT switches, through the keyboard contacts corresponding to the selected transmitter,
- the loudspeaker MUTING line, through a diode.

(a4) Voice Communication through boomset microphone and external PTT switch

Operation is identical with that described in paragraph 4.B.(2)(a)(a2), but with BOOM-MASK switch in the BOOM position.

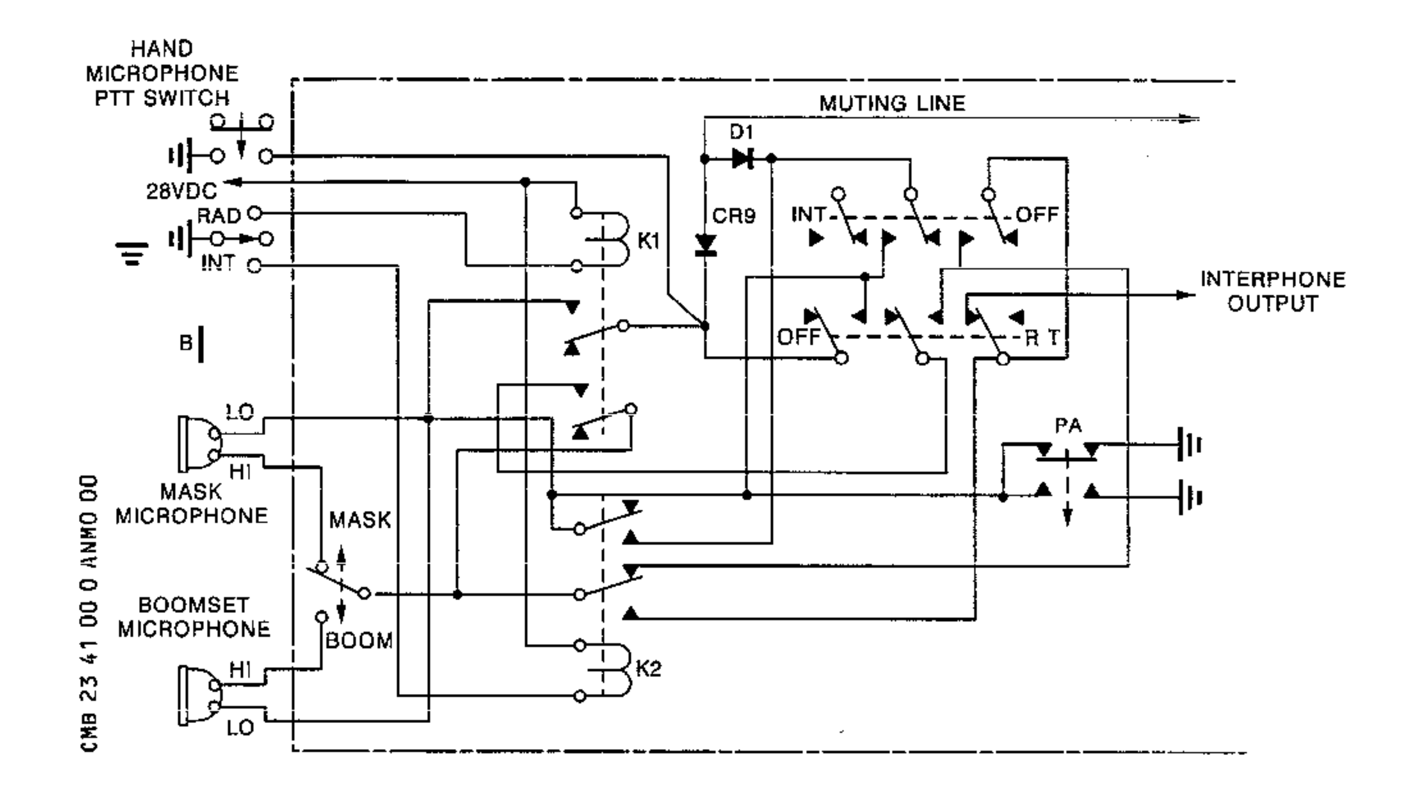
(a5) Voice Communication through boomset microphone and audio selector panel PTT switch

Operation is identical with that described in paragraph 4.B.(2)(a)(a3), but with BOOM-MASK switch in the BOOM position.

(b) Voice Communication via interphone amplifier (Ref. Fig. 007)

(b1) Direct Voice Communication via mask microphone

The BOOM-MASK switch is in the MASK position.
The external RAD-INT PTT switch is placed in the INT position, thus energizing relay K2 and de-energizing relay K1.
The R/T-INT PTT switch on the audio selector panel is placed in the intermediate (OFF) position.
The HI signal from the mask microphone is applied to the interphone output through the BOOM-MASK switch, a contact of relay K2 and the audio selector panel R/T-INT PTT switch.
The LO signal is obtained by means of a ground connection, through a contact of the PA key contact, and applied to:



Audio Selector Panel : Voice
Communication in the INT Mode
Figure 007

- the LO line of the various microhones,
- the loudspeaker MUTING line, through a contact of relay K2 and diode D1.

(b2) Voice Communication via mask microphone and audio selector panel PTT switch

The audio selector panel PTT switch is placed in the INT position (the OFF-R/T section is in the OFF position).

With the RAD-INT external PTT switch placed and held in the RAD position, relay K1 is energized and relay K2 is de-energized.
The HI signal from the mask microphone is applied to the audio selector panel PTT switch through the BOOM-MASK switch placed in the MASK position and a contact of relay K2. It is then applied to the interphone output.
The LO signal is obtained by means of a ground connection and applied, through the PA key contact (PA key disengaged), to:

- the LO line of the various microphones,
- the loudspeaker MUTING line, through the audio selector panel PTT switch and diode D1, or through the contact of relay K1 (K1 energized) and diode CR9.

With the RAD-INT external PTT switch placed in the intermediate (OFF) position, both relays K1 and K2 are de-energized.
The HI signal from the mask microphone is applied to the audio selector panel PTT switch and then to the interphone output, through the BOOM-MASK switch placed in the MASK position and the contact of relay K2.
The LO signal is obtained by means of a ground connection and applied, through the contact of the PA key (PA key disengaged), to:

- the LO line of the various microphones,
- the loudspeaker MUTING line, through the audio selector and PTT switch and diode D1.

With the RAD-INT external PTT switch in the INT position, relay K2 is energized and relay K1 is de-energized.
The HI signal from the mask microphone is applied to the interphone output through the contact of relay K2 and the audio selector panel PTT switch.
The LO signal is obtained by means of a ground connection and, through the contact of the PA key (PA key disengaged), applied to:

- the LO line of the various microphones
- the loudspeaker MUTING line, through diode D1 and the audio selector panel PTT switch or the contact of relay K2 (K2 energized).

(b3) Direct Voice Communication via boomset microphone

Operation is identical with that described in paragraph 4.B.(2)(b)(b1), but with BOOM-MASK switch placed in the BOOM position.

(b4) Modulation by means of boomset microphone and audio selector panel PTT switch

Operation is identical with that described in paragraph 4.B.(2)(b)(b2), but with BOOM-MASK switch placed in the BOOM position.

(c) Voice Communication in the Public Address Mode (Ref. Fig. 008)

(c1) Voice communication via hand microphone

B NOTE: Hand microphone is deleted by CM42602.

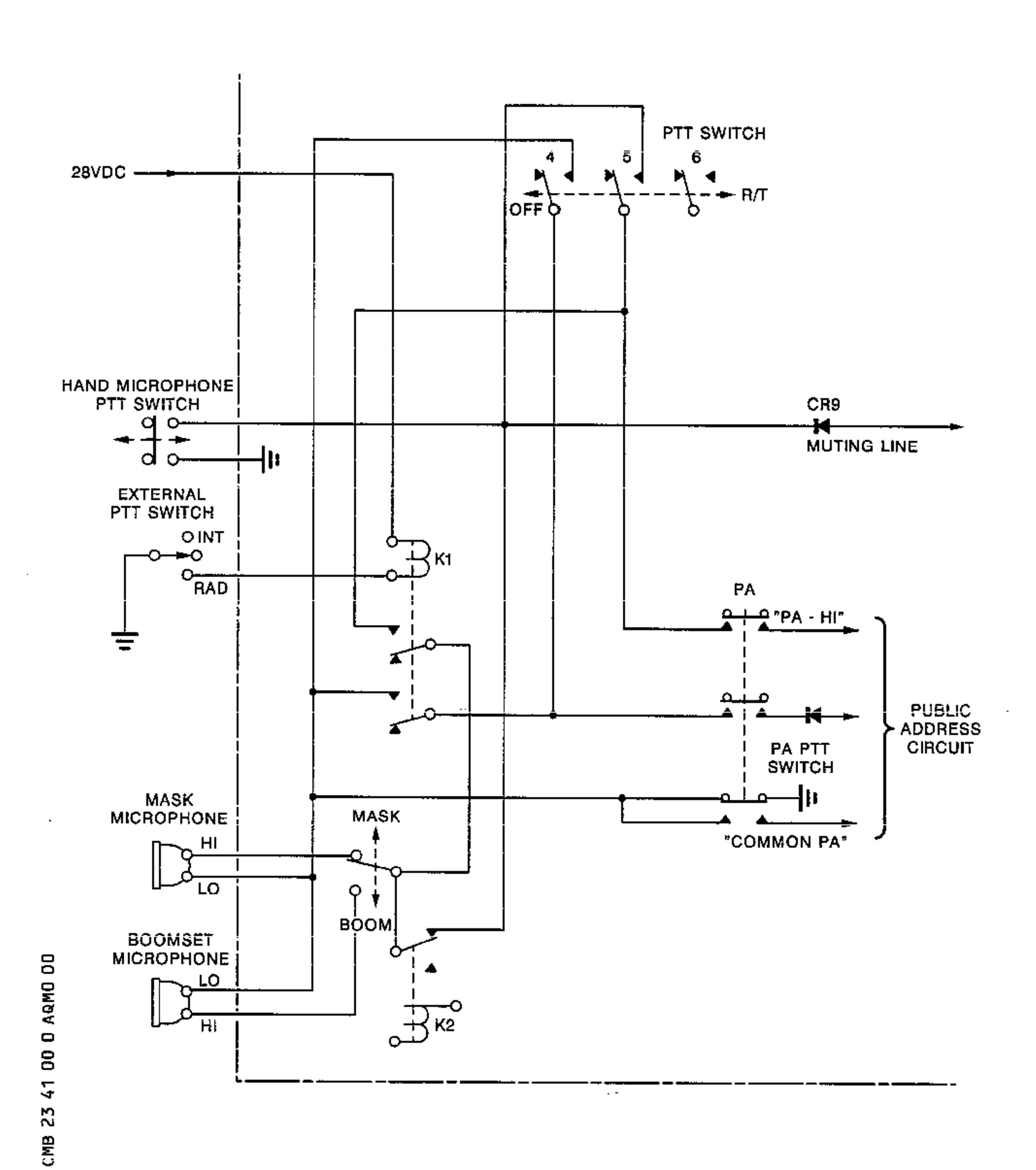
The PA key on the keyboard is engaged.
With the RAD-INT external PTT switch in the intermediate position, relays K1 and K2 are de-energized.
The audio selector panel PTT switch is in the intermediate (OFF) position.
With the hand microphone PTT switch engaged, the following lines are connected to ground:

- the loudspeaker MUTING line, through diode CR9,
- the PA PTT switch line, through the second contact of the PA key (PA key engaged) and its diode.

The HI signal from the hand microphone is directly applied to the public address circuit through the first contact of the PA key (PA key engaged).
The LO signal from the hand microphone returns to the LO circuit of the various microphones, through the public address circuit and the third contact of the PA key (PA key engaged).
The LO signal from the hand microphone returns to the LO circuit of the various microphones, through the public address circuit and the third contact of the PA key (PA key engaged).

(c2) Voice communication via mask microphone and external PTT switch

With the external PTT switch in the intermediate position, relays K1 and K2 are de-energized.



Audio Selector Panel: Voice Communication in the PA mode
Figure 008

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The audio selector panel PTT switch is in the intermediate (OFF) position.
The BOOM-MASK switch is in the MASK position.
The "common PA" signal is obtained by means of a ground connection and applied to the LO line through the public address circuit and the third contact of the PA key (PA key engaged). It is then fed, through a contact of K1, to:

- the loudspeaker MUTING line, through diode CR9,
- the PA PTT switch line, through the second contact of the PA key and its diode.

The HI signal from the mask microphone is applied to a contact of relay K1, through the BOOM-MASK switch, and then to the public address circuit, by means of the first contact of the PA key.

(c3) Voice communication via mask microphone and audio selector panel PTT switch

With the external PTT switch in the intermediate position, relays K1 and K2 are de-energized.
The audio selector and PTT switch is placed and held in the R/T position.
The HI signal from the mask microphone is applied to the public address circuit through the BOOM-MASK switch, a contact of relay K2, contact (5) of the PTT switch and the first contact of the PA key (PA key engaged).
The "common PA" signal from the public address circuit is applied to the LO line of the various microphones through the third contact of the PA key (PA key engaged).
Through the fourth contact of the audio selector panel PTT switch, the "common PA" signal is fed to:

- the loudspeaker MUTING line, through diode CR9,
- the PA PTT switch line, through the second contact of the PA key (PA key engaged) and its diode.

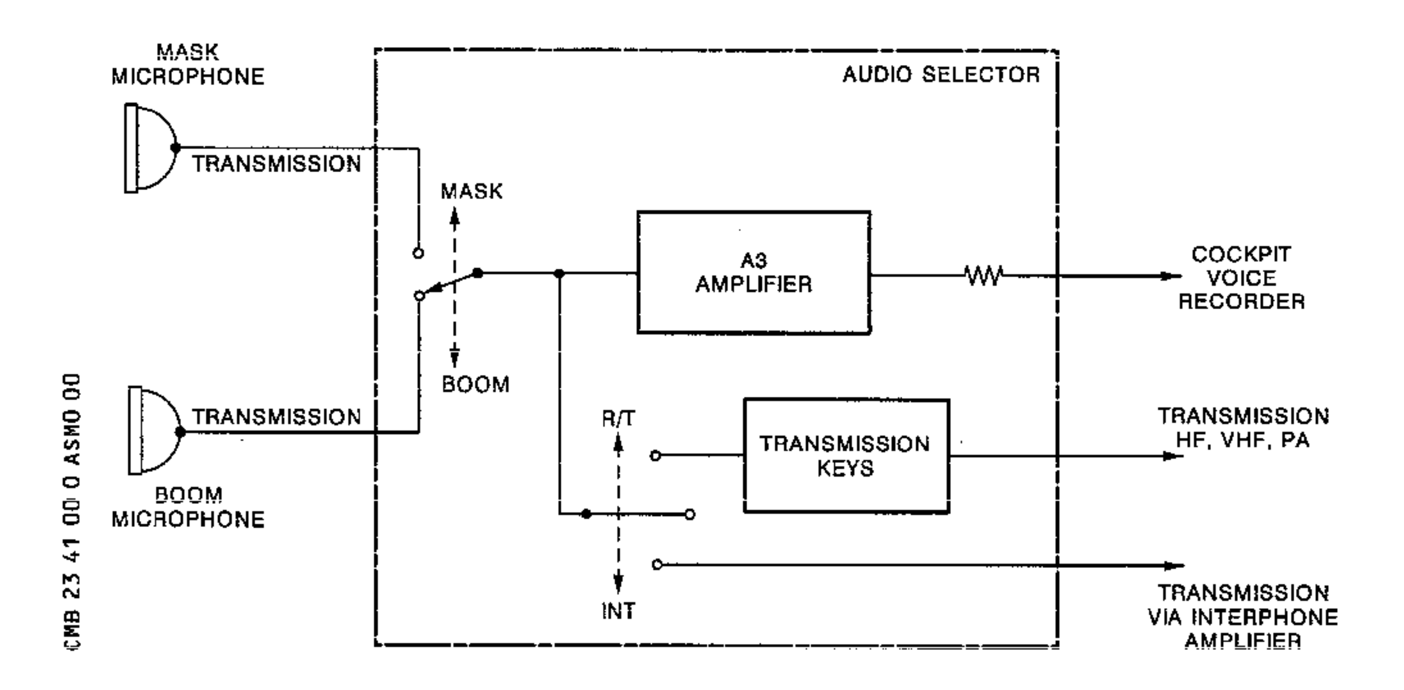
(c4) Voice communication via boomset microphone and external PTT switch

Operation is identical with that described in paragraph 4.B.(2)(c)(c2), but with BOOM-MASK switch in the BOOM position.

(c5) Voice communication via boomset microphone and audio selector panel PTT switch

Operation identical with that described in paragraph 4.B.(2)(c)(c3), but with BOOM-MASK switch in the BOOM position.

(d) Voice Communication via Cockpit Voice Recorder (Ref. Fig. 009)



Voice Communication via Cockpit Voice Recorder
Figure 009

Voice signal from mask microphone or boomset microphone is applied to BOOM-MASK switch. When one of the two channels has been selected, the signal is applied to amplifer A3, which enables adaptation of the line with the cockpit voice recorder input.

**ON A/C 007-007

4. Audio Selector Panel - TEAM CP 1600A

A. Description (Ref. Fig. 010)

(1) Mechanical Characteristics

The audio selector panel is rectangular and weighs 1.300 Kg (2.9 lb).

(a) The front face includes:

(a1) A keyboard, with seven keys marked VHF1, VHF2, HF1, HF2, INT, CABIN, PA.
The first four keys are used for the selection of radio transmissions.
The fifth key is used for communication between crew members.
The sixth key is used for communication between Stewards and ground service personnel.
The seventh key controls the public address system.
Only one key may be engaged at a time.
Engaging a key results in automatic disengagement of the previously engaged key.
When engaged, the keys illuminate.

(a2) Thirteen push-buttons, each with an integral volume potentiometer, marked VHF1, VHF2, HF1, HF2, INT, CABIN, PA, MARKER, VOR-ILS-DME1, VOR-ILS-DME2, ADF1, ADF2, the thirteenth being spare.
When disengaged, each of these independent push-buttons serves to select one reception channel and provides volume adjustment by means of the integral potentiometer.
Reception mixing is possible. When disengaged the push-buttons illuminate.

(a3) A three-position INT-RADIO push-to-talk switch

- In INT position, or conference function, the PTT switch remains engaged in the absence of any further action,
- In the intermediate position, it enables all push-to-talk switches to be used.

R Audio Selector Panel: Front Face
Figure 010

R - In the RADIO position, the PTT switch must be manually held for the whole duration of the transmission. When released, it automatically switches back to the intermediate position.

R (a4) A VOICE ONLY push-button which, when engaged, connects a filter to the ADF or VOR reception circuit when the aircraft is within range of the station.
When engaged, the push-button illuminates.

R (b) The rear panel is equipped with two connectors which serve to connect the audio selector panel to the aircraft electrical network.

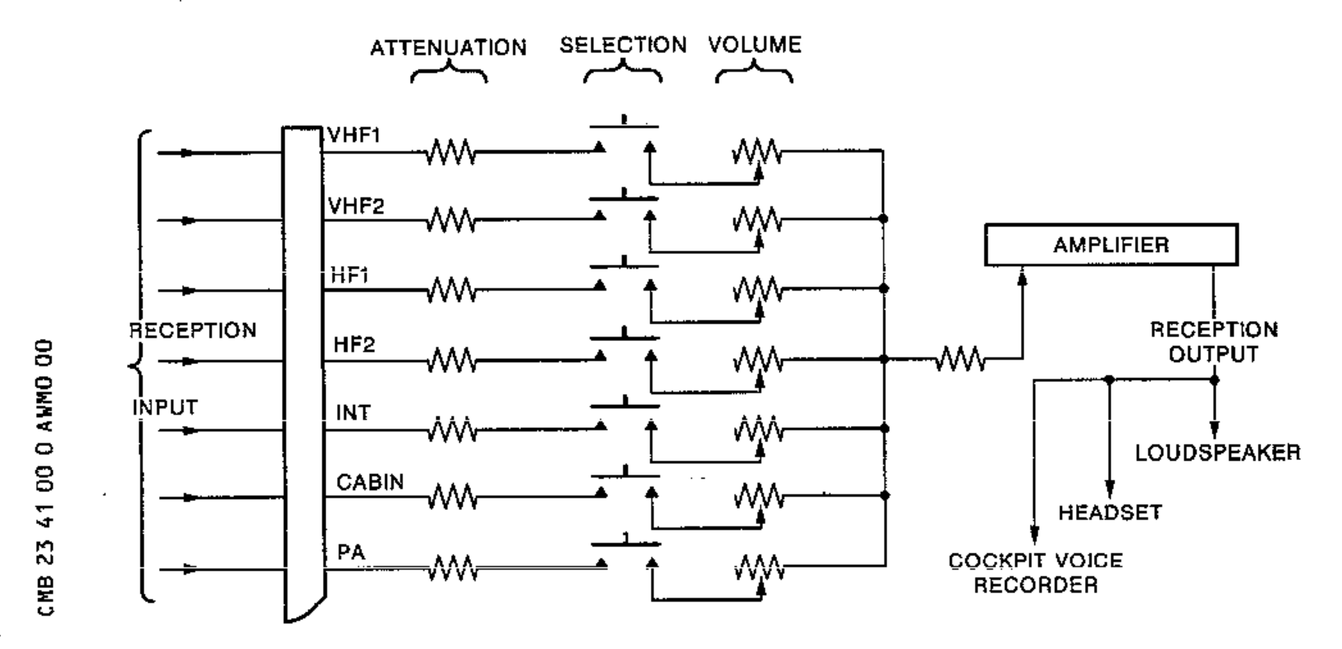
R (2) Electrical characteristics

R The audio selector panel is equipped with push-buttons, potentiometers, switches, one amplifier, one filter and relays.
Power supply : 28 V d.c., 100mA maximum
Lighting : 5 V a.c., 400Hz, 1A maximum.

R B. Operation

R (1) Reception (Ref. Fig. 011 and 012)

R (a) Communication channels



R Audio Selector Panel : Reception of Communication Channels
Figure 011

Audio frequency signals from:

- the receivers (push-buttons, VHF1, VHF2, HF1, HF2)
- the interphone amplifier (push-buttons INT or CABIN)
- the public address amplifiers (push-button PA) are applied to their respective attenuators.

The audio frequency signals of the channel selected are fed to the reception amplifier, after level adjustment by means of the integral potentiometer.

After amplification, the signal is applied to:

- the cockpit voice recorder circuit,
- the headset circuit,
- the cabin loudspeaker circuit.

(b) Navigation channels

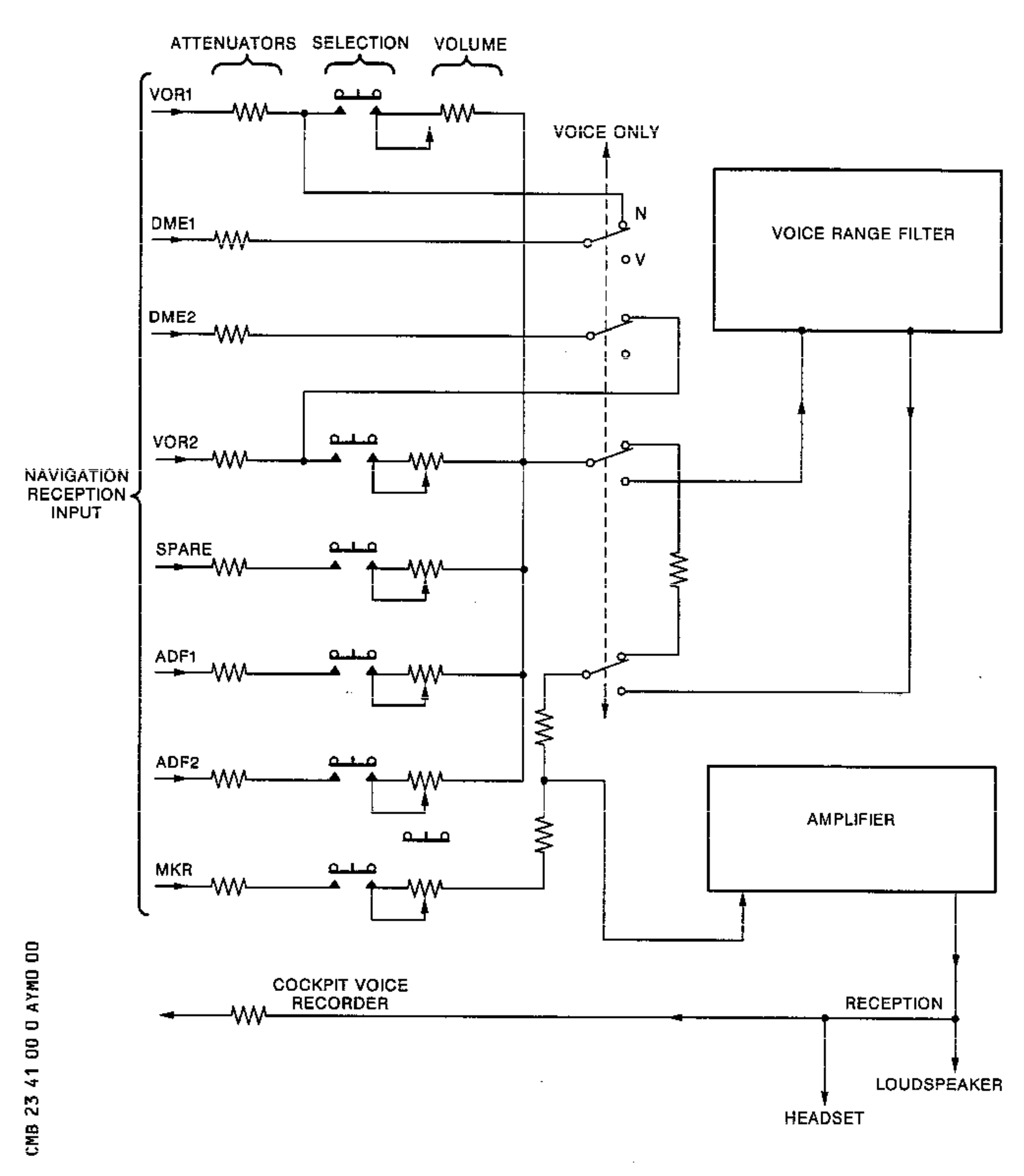
Audio frequency signals from the VOR, ILS, DME, ADF, MARKER navigation receivers are directly applied to their respective attentuators. The audio frequency signals of the channel selected are applied as follows, after level adjustment by means of the integral volume control potentiometer:

- the MARKER signal is directly applied to the amplifier, via the MRK push-button contacts
- the DME1 or DME2 signals are directly applied to the amplifier via the VOR1 or VOR2 push-button contacts
- the VOR1 or ILS1, VOR2 or ILS2, ADF1 or ADF2 signals are applied to the VOICE ONLY push-button:

  - if the VOICE ONLY push-button is in N position, the selected signal is directly applied to the amplifier.
  - if the VOICE ONLY push-button is in V position, the selected signal is applied to the filter. After level adjustment, the attenuated signal is applied to the amplifier.

  NOTE: The reception of DME signals is not possible when the VOICE ONLY push-button is in V position.

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R Audio Selection Panel:Reception of navigation Channels
Figure 012

After amplification, the signal is applied:

- to the cockpit voice recorder circuit
- to the headset circuit
- to the cabin loudspeaker circuit.

(2) Voice Communication

(a) Voice communication via VHF and HF transmitters (Ref. Fig. 013)

(a1) Voice communication through hand microphones

With control column and audio selector panel RAD-INT push-to-talk switches in the intermediate position, relays K1, K2 and K3 are de-energized.
With the hand microphone push-to-talk switch pressed, the ground, is connected through the CABIN LO "break" contact to:

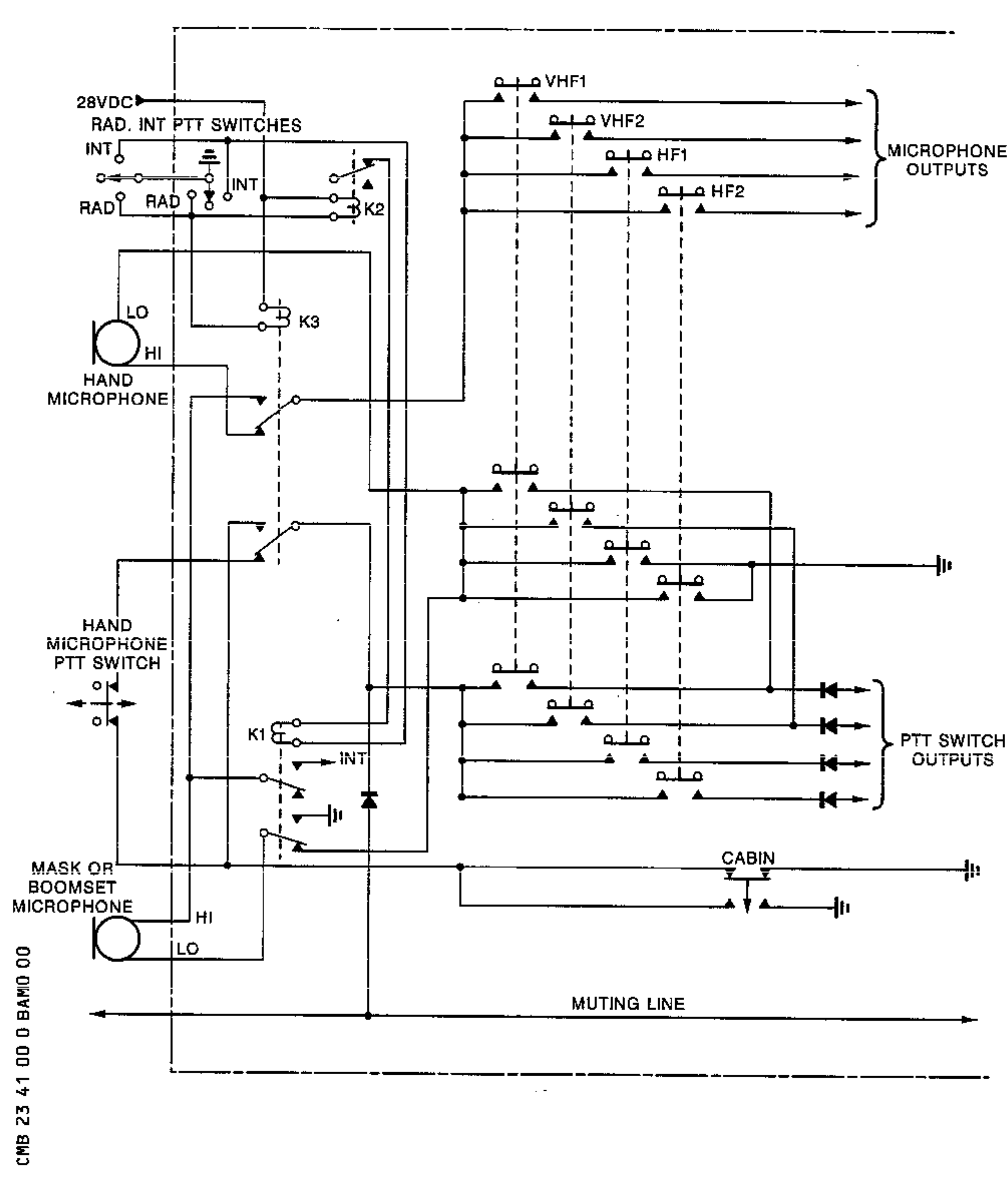
- the "break" contact of relay K3, and thence to the push-to-talk switch circuit, through the keyboard contacts corresponding to the selected transmitter and the relevant diode
- to the loudspeaker muting line, through a diode.

The HI signal from the hand microphone is applied to the microphone output circuit, through the contacts of relay K3 (K3 de-energized) and the keyboard contacts corresponding to the selected transmitter.

The LO signal from the hand microphone is given by a ground connection:

- directly, by means of HF channel selection on the keyboard
- through the push-to-talk switch, after HF channel selection on the keyboard.

(a2) Voice communication via mask or boomset microphone



R

Audio Selector Panel: Voice Communication via VHF and HF Transmitters
Figure 013

The hand microphone push-to-talk switch is released and, therefore, made inoperative. With the RAD-INT push-to-talk switches in RAD position, relays K2 and K3 are energized and relay K1 is de-energized.
The ground connection from the CABIN LO contact (CABIN LO key disengaged) is connected to the contact of relay K3 (K3 energized), and thence to:

- the push-to-talk switch circuit, through the keyboard contacts corresponding to the selected transmitter, and through its diode.
- the loudspeaker muting line, through a diode.

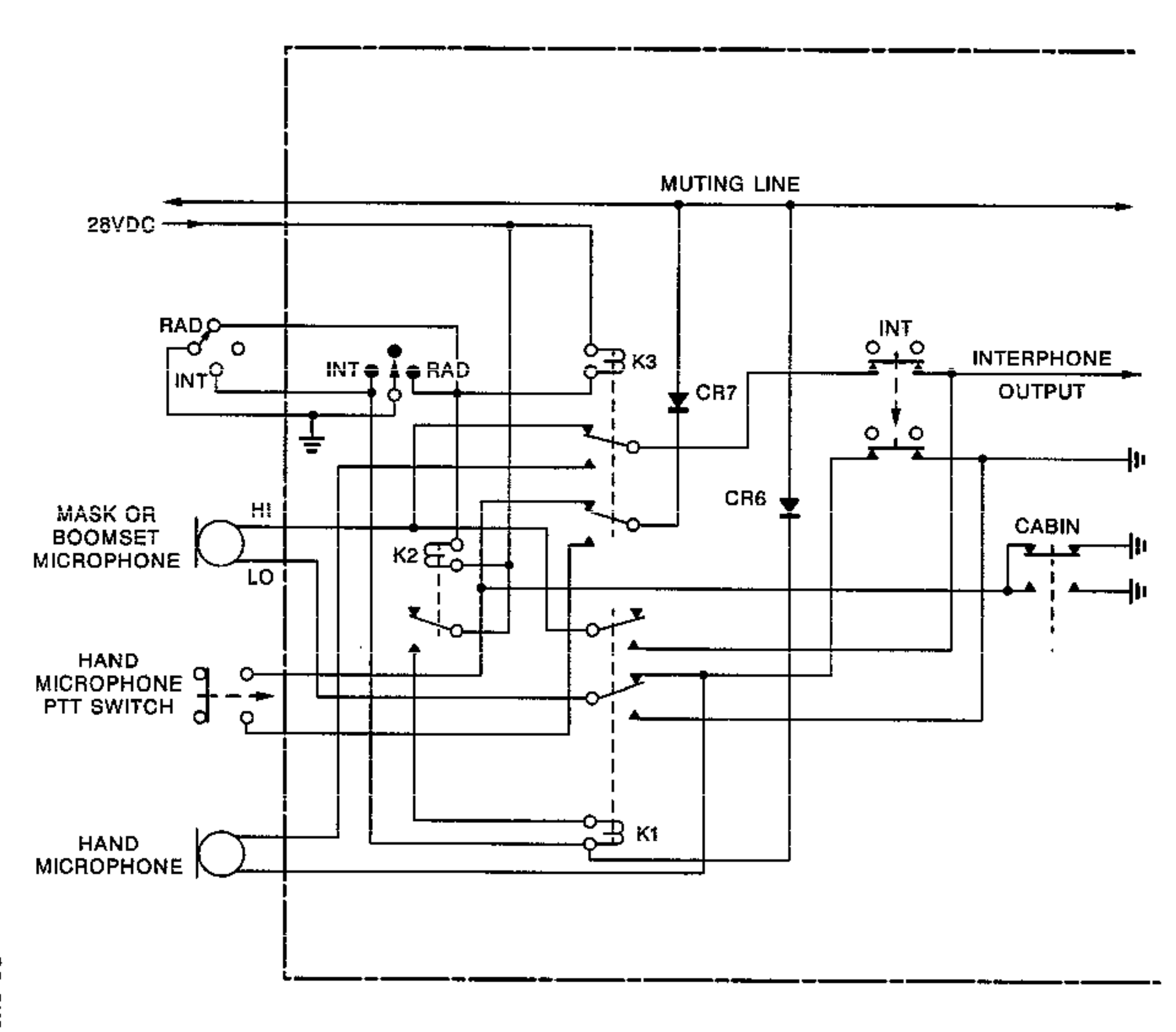
The HI signal from the mask microphone or from the boomset microphone is applied to the output circuit, through contacts of relay K3 (K3 energized) and the keyboard contacts corresponding to the selected transmitter.

The LO signal from the mask microphone or the boomset microphone is given by a ground connection:

- Directly, by means of channel selection on the keyboard
- Through the push-to-talk switch, after HF channel selection on the keyboard.

(b) Voice Communication via FLIGHT interphone (Ref. Fig. 014)

The interphone voice communication can be achieved by various means, i.e. either using the mask or boomset microphone selected from the audio selector panel, or from the hand microphone. Nevertheless, using the hand microphone will only be possible if the INT square key on the keyboard is engaged.



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R Audio Selector Panel: Voice Communication in the INT Mode
Figure 014

(b1) Voice communication following selection of the INT key on the keyboard

- Voice communication through mask or boomset microphone.

  The INT key engaged on keyboard, the interphone communication is effected by maintaining the RAD-INT push-to-talk switch in the RAD position. Relays K2 and K3 are energized and relay K1 is de-energized.
  The HI signal from the mask or boomset microphone is applied to the interphone amlifier output through the contacts of relay K3 (K3 energized) and the INT key contact.
  The LO signal from the mask or boomset microphone is given by a ground connection established by the K1 contact (K1 de-energized) and the INT key contact.
  The loudspeaker MUTING line is connected to ground by means of the CABIN key, through a "make" contact of relay K3 and diode CR7.

- Voice communication through hand microphone.

  With control column and audio selector panel RAD-INT push-to-talk switches in the intermediate position, relays K1, K2, K3 are de-energized.
  The HI signal from the hand microphone is applied to the interphone amplifier output through a contact of relay K3 (K3 de-energized) and the contact of the INT key.
  The LO signal from the hand microphone is given by a ground connection established by a contact of the INT key on the keyboard.
  With the hand microphone push-to-talk switch engaged, the MUTING line is connected to ground through the CABIN key contact (CABIN key disengaged) diode CR7 and a contact of relay K3 (K3 de-energized).

R (b2) Direct INT interphone communication

R Direct interphone communication is obtained by placing the RAD-INT push-to-talk switch in INT position.
Relays K2 and K3 are de-energized and K1 is energized.
The HI signal from the mask microphone or from the boomset microphone is directly applied to the interphone amplifier output through a contact of relay K1 (K1 energized).
The LO signal from the mask microphone or from the boomset microphone is given by a ground connection established by a contact of relay K1 (K1 energized).
The loudspeaker MUTING line is connected to ground directly from the push-to-talk switch through diode CR6.

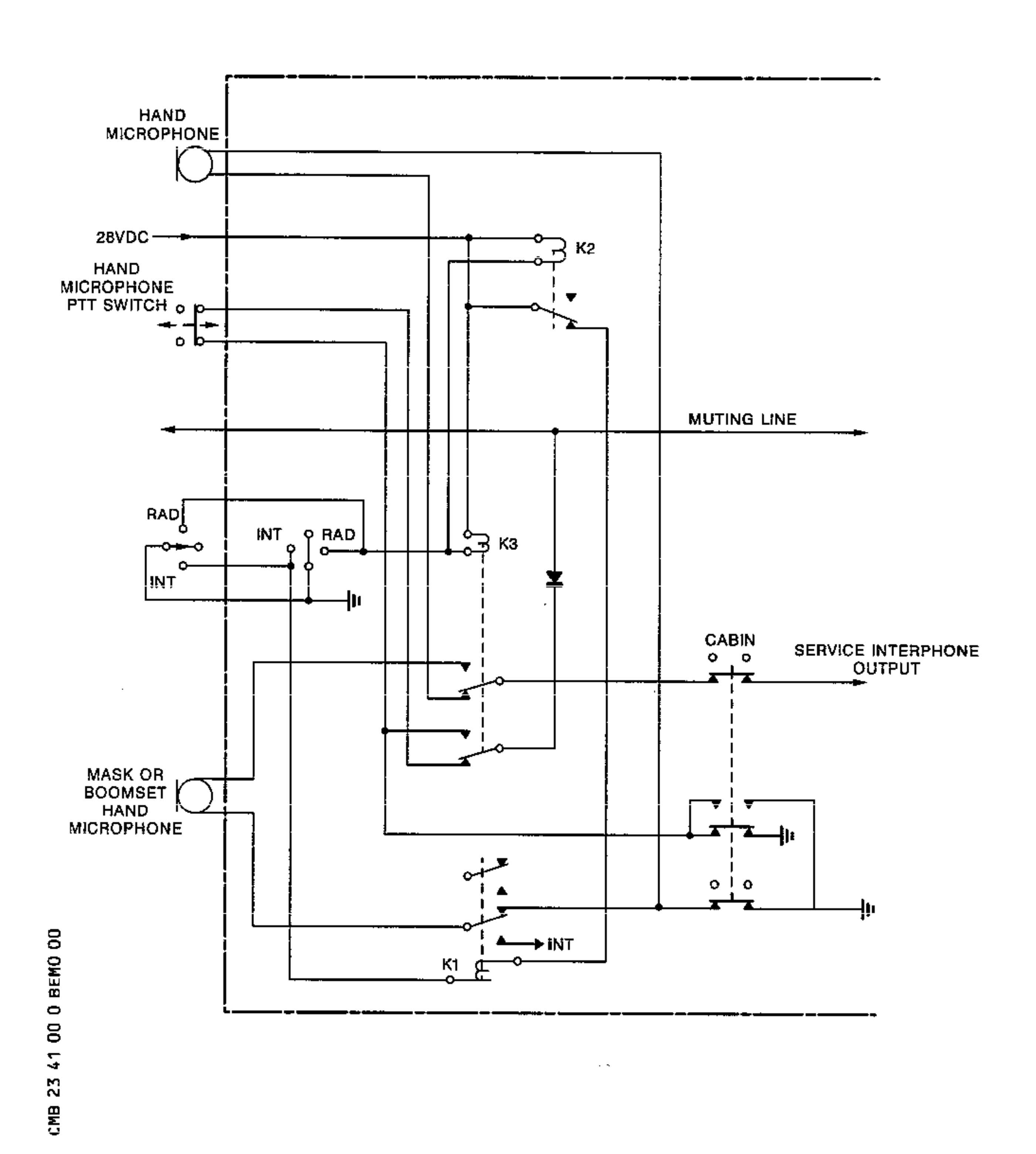
R (c) Voice communication via SERVICE interphone (Ref. Fig. 015)

R (c1) Voice communication by means of the hand microphone

R With the RAD-INT push-to-talk switches in the intermediate position, relays K1, K2, K3 are de-energized.
The CABIN key on the keyboard is engaged.
With the hand microphone push-to-talk switch engaged, the loudspeaker MUTING line is connected to ground through the third contact of the CABIN key on the keyboard (CABIN key engaged), the contact of relay K3 (K3 de-energized) and diode CR7.
The LO signal from the hand microphone is given by a ground connection established directly by the second contact of the CABIN key on the keyboard (CABIN key engaged).
The HI signal from the hand microphone is applied to the service interphone through a contact of relay K3 (K3 de-energized) and the first contact of the CABIN key (CABIN key engaged).

R (c2) Voice communication through mask or boomset microphone

R The hand microphone push-to-talk switch is released and the CABIN key on the keyboard is still engaged.



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R Audio Selector Panel: Voice Communication in CABIN Mode
Figure 015

R With control column and audio selector panel RAD-INT push-to-talk switches placed in RAD position, relays K2 and K3 are energized and relay K1 is de-energised.
The HI signal from the mask microphone or from the boomset microphone is applied to the SERVICE interphone through a contact of relay K3 and of the CABIN key.
The LO signal is given by a ground connection established by the second CABIN key and a contact of relay K1 (K1 de-energized).
The loudspeaker MUTING line is connected to the ground through the third contact of the CABIN key, a contact of relay K3 (K3 energized) and diode CR7.

R (d) Voice Communication in Public Address mode (Ref. Fig. 016)

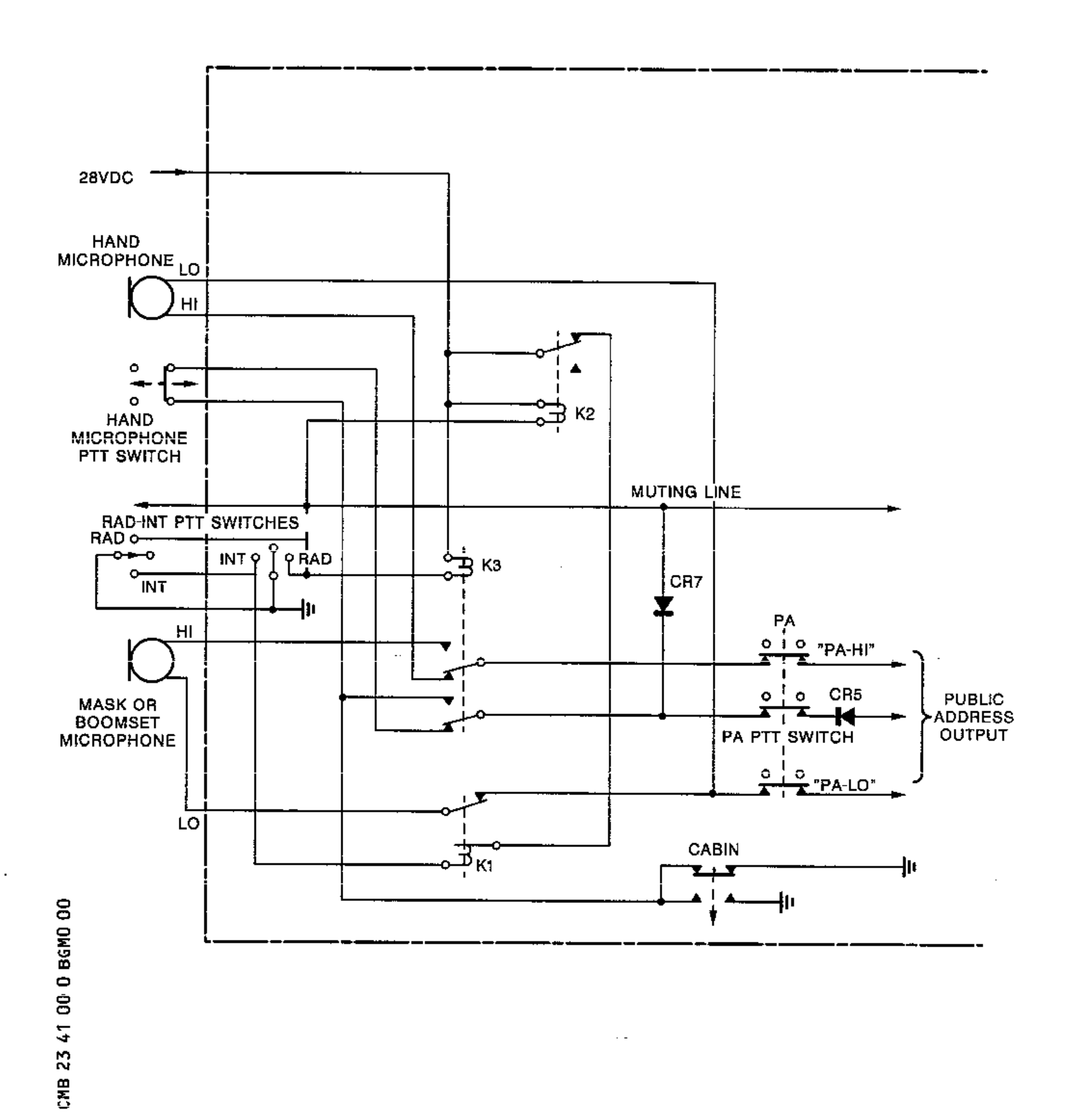
R (d1) Voice Communication through hand microphone

R On the keyboard, the CABIN key is released and the PA key is engaged.
With control column and audio selector panel RAD-INT push-to-talk switches in the intermediate position, relays K1, K2, K3 are de-energized.
When the hand microphone PTT switch is engaged, it provides a ground connection, through a contact of the CABIN key (released) and a contact of relay K3 (K3 de-energized) to:

R
- the loudspeaker muting line, through diode CR7,
- the PA PTT switch line, through the second contact of the PA key (engaged) and diode CR5.

R The HI signal from the hand microphone is applied to the PA circuit through a contact of relay K3 (K3 de-energized) and the first contact of the PA key (engaged).
The LO signal from the hand microphone is directly applied to the PA circuit through the third contact of the PA key (engaged).

R (d2) Voice communication through mask or boomset microphone



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R

Audio Selector Panel: Communication in PA Mode
Figure 016

The hand microphone PTT switch is released and either the station or audio selector panel RAD-INT PTT switch is placed and held in the RAD position. Relays K2 and K3 are energized and relay K1 is de-energized.

A ground connection is provided, by the CABIN key (released) and a contact of relay K3, to:

- The loudspeaker muting line, through diode CR7.
- The PA PTT switch, through the second contact of the PA key (engaged) and diode CR5.

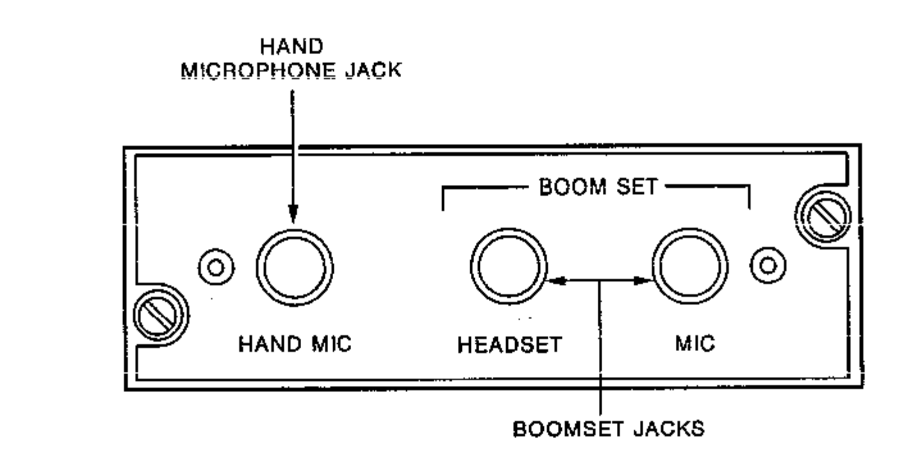
The HI signal from the mask or boomset microphone is applied to the PA circuit through a contact of relay K3 (K3 energized) and the first contact of the PA key (engaged).

The LO signal from the mask or boomset microphone is applied to the PA circuit through a contact of relay K1 (K1 de-energized) and the third contact of the PA key (engaged).

**ON ALL A/C

5. Jack Panel - TEAM BR1739A

A. Description (Ref. Fig. 017)



Jack Panel : Front Face View
Figure 017

(1) Mechanical characteristics

The jack panel is rectangular and secured by two dzus fasteners.

(a) The front panel includes:

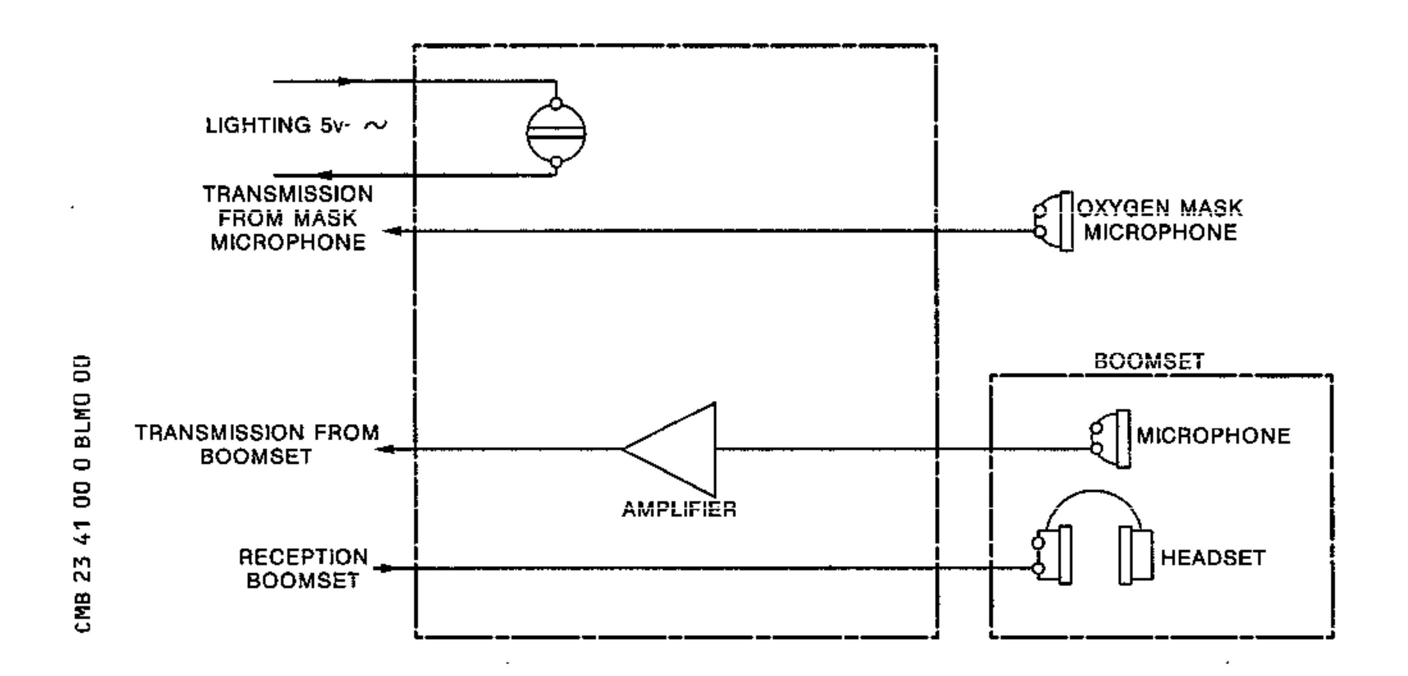
- One HAND MIC jack, used for connecting a hand microphone
- Two jacks allowing connection of a boomset
- One HEADSET jack used for connecting headsets
- One MIC jack used for connecting microphone.

(b) On the rear panel is a connector which provides connection with the aircraft electrical network.

(2) Mechanical characteristics

The jack panel is provided with an amplifier, the purpose of which is to increase the boomset microphone modulation level.
Lighting of the panel is provided by a 5 V a.c. external light.

R B. Operation (Ref. Fig. 018)



R Jack Panel : Block Diagram
Figure 018

The jack panel allows direct connection of the reception and modulation equipment to the interphone system:

- Boomset, mask microphone, hand microphone.

Reception is available:

- On HEADSET jack.

Modulation is applied:

- directly, by means of the mask microphone or the hand microphone.
- by means of an amplifier, for the boomset microphone connected to the MIC jack.

6. System Operation

A. Use of the System

Each crew member (Captain, First Officer, Flight Engineer and First Supernumerary) is provided with:

(1) An audio selector panel which allows:

- Voice radio communication (HF-VHF)
- Voice communication between crew members, Stewards and ground service personnel together with public address announcements
- Reception on navigation receivers.

B (2) A jack panel which allows connecting boomsets and headsets which provides the possibility of simultaneously using the microphone with an integral PTT switch.

The fifth crew member (Second Supernumerary) is only provided with a jack panel connected to the Flight Engineer's audio selector panel. Selection of transmission or receiption channels is therefore to be made on this audio selector panel.
B Selection of either mask microphone or boomset microphone must be made by means of switch R24, on panel 20-215.

NOTE: Each jack panel is connected to the microphone integral with the oxygen mask.

Ground service jacks provide communication between the inside and the outside of the aircraft after positioning NORMAL-CABIN switch in CABIN position and SERVICE I/PHONE FLIGHT-GROUND switch in GROUND position.

Each of the three Steward stations is provided with a telephone handset connected to the interphone amplifier.

R B. Power Supply (Ref. Fig. 019)

(1) Electrical supply through aircraft electrical network

With the aircraft supplied with power by its own electrical network (engines running), the electrical supply from the DC and AC busbars provides each system with the voltages necessary for system operation. The electrical supply circuit from ground connector (X17) is thus disconnected, circuit breaker (R102) is not supplied, relays (R103, R104) are de-energized. This results in applying a + 28 V d.c. signal through circuit breakers (R89, R90)

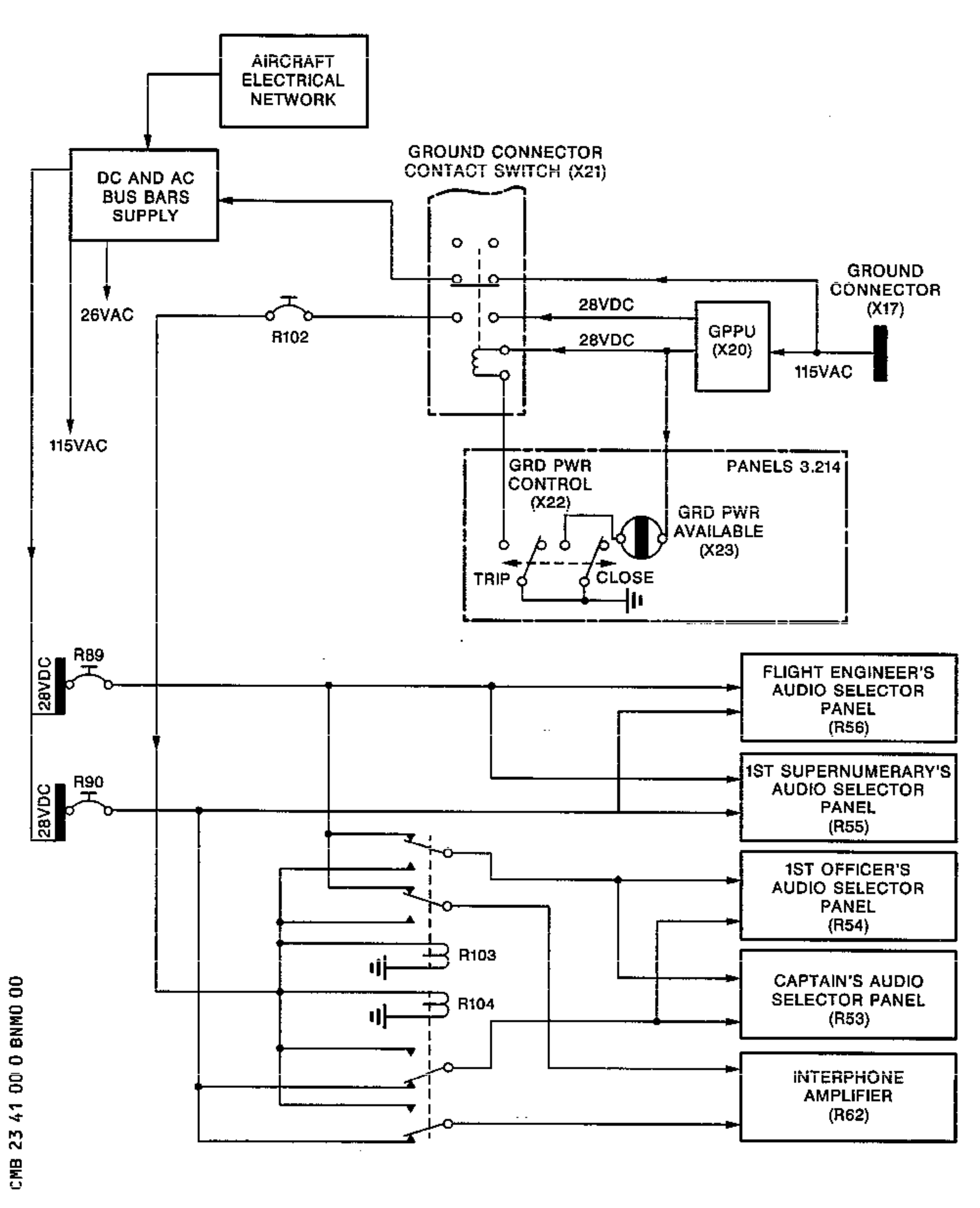
- to First Supernumerary's (R55) and Flight Engineer's (R56) audio selector panels.
- through the "break" contacts of relays (R103, R104) to Captain's (R53) and First Officer's (R54) audio selector panels and to interphone amplifier (R62) via 28V-1 and 28V-2 inputs.

(2) Electrical supply through a ground power unit

The aircraft is supplied through connection of electrical ground connector (X17)to electrical ground power unit.

(a) GRD PWR CONTROL switch in CLOSE position

On Flight Engineer's panel 3-214, place GRD PWR CONTROL switch (X22) in CLOSE position. The coil of ground connector contact switch (X21) is de-energized and the 115 V a.c. signal from the ground power unit is applied to DC and AC busbars which then feed it to each system in the same way as the aircraft electrical network.
Circuit breaker (R102) is not supplied.
Relays (R103, R104) are de-energized. The interphone system electrical supply is thus identical with that described in above paragraph.



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Interphone: System Electrical Supply
Figure 019

R

(b) GRD PWR CONTROL switch in TRIP position

On Flight Engineer's panel 3-214, place GRD PWR CONTROL switch (X22) in TRIP position. The coil of ground connector contact switch (X21) is energized, GRD PWR AVAILABLE caption light (X23) illuminates and the DC and AC busbars are not supplied.
The 115 V a.c. signal from the ground power unit is applied to the Ground Power Protection Unit, (GPPU), (X20). A 28 V d.c. output from this unit is applied to contact switch (X21) which feeds it to circuit breaker (R102). Circuit breaker (R102) energizes relays (R103, R104).

Relay (R103) supplies through circuit breaker (R102):

- interphone amplifier (R62) via 28V-1 input
- First Officer's audio selector panel (R54).

Relay (R104) supplies through circuit breaker (R102):

- interphone amplifier (R62) via 28V-2 input
- Captain's audio selector panel (R53).

During this procedure, Flight Engineer's (R56) and First Supernumerary's (R55) audio selector panels are not supplied.

R C. Operation (Ref. Fig. 020 and 021)

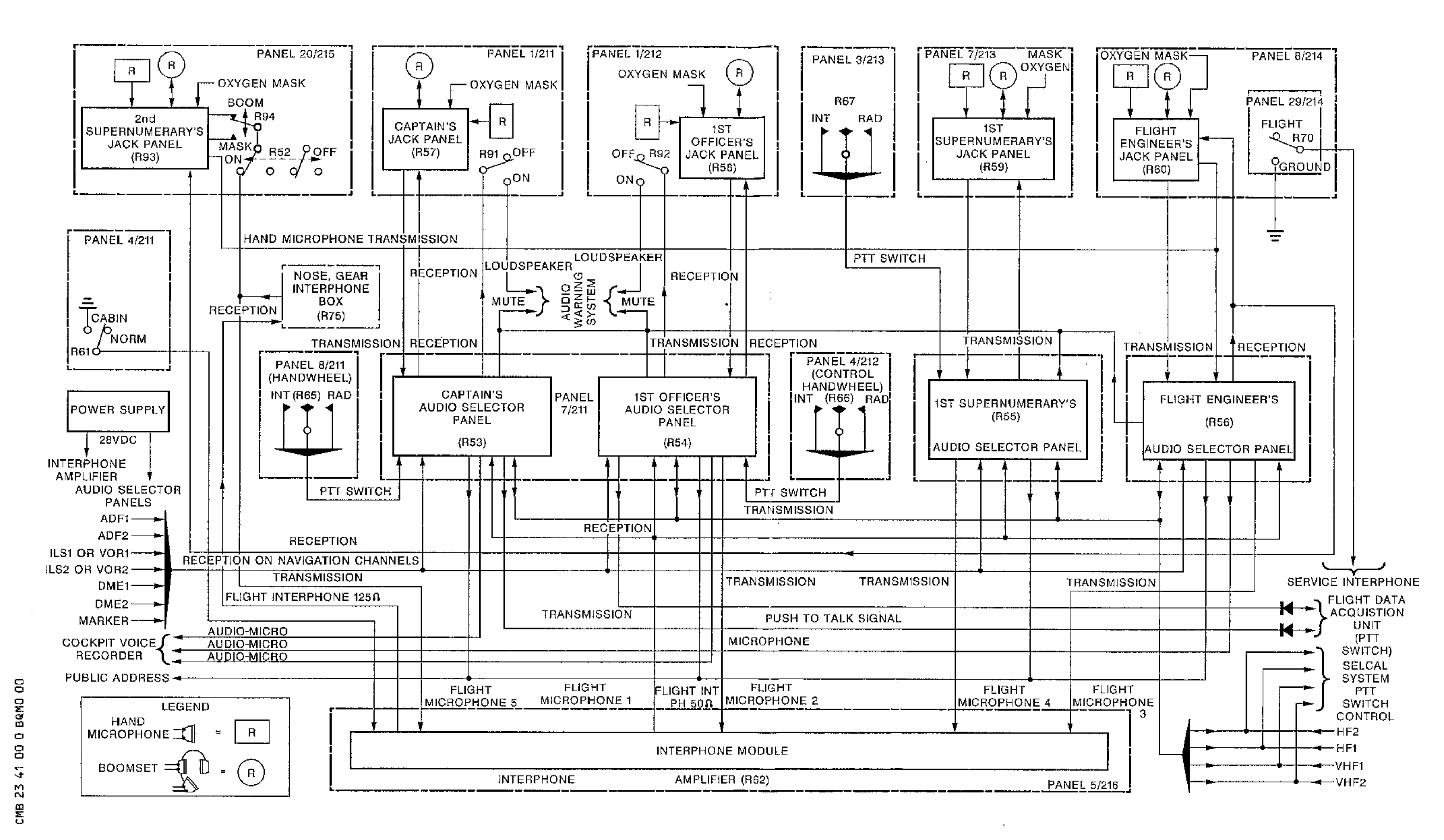
B With the 28VDC power supply provided and the boomset connected to the jack panel at each crew member station, the interphone system may be used according to the various modes selected on the audio selector panel, after the I/PHONE NORMAL-CABIN switch (R61), on panel 4-211, has been placed in NORMAL position.

(1) Radio communication

(a) Transmission

Selecting one of the VHF or HF transmission channels on his audio selector panel gives a crew member a transmitting possibility, by operating either the audio selector panel or the control column handwheel PTT switch, communication being achieved via PTT switch integral with either his oxygen mask or his boomset microphone.

B



Interphone: Operation With Flight Module
Figure 020

R

If the loudspeaker ON-OFF switch (R91 or R92) on the Captain's or First Officer's console, has been left in the ON position, the Audio Warning loudspeaker muting must be controlled by means of the audio selector panel MUTING line.

B

(b) Reception

Selecting the VHF or HF reception channel on his audio selector panel gives a crew member a reception possibility, using his boomset or the audio warning loudspeaker. In the latter case, the Captin or First Officer must place the LOUDSPEAKER ON-OFF switch (R91 or R92), on their respective console, in the ON position.

(2) Reception of navigation signals

Selecting the desired navigation channel on his audio selector panel gives a crew member a reception possibility for signals from the selected ground marker. The reception procedure is identical with the voice radio communication reception procedure.

(3) Voice communication associated with the interphone function

The crew members may carry out voice intercommunication, by selecting the interphone channel on their respective audio selector panels and using the interphone amplifier flight module, with I/PHONE CABIN - NORMAL switch (R61) in NORMAL position.
If a crew member wishes to use either his oxygen mask microphone or his boomset microphone, he must use his external PTT switch or his audio selector panel PTT switch, after placing the BOOM-MASK switch, on the audio selector panel, in the appropriate position.

Voice communication from either one or the other microphone system is applied to the interphone amplifier (R62), which supplies it to the amplifier flight module:

- Flight Microphone 1 for the Captain
- Flight Microphone 2 for the First Officer
- Flight Microphone 3 for the Flight Engineer
- Flight Microphone 4 for the First Supernumerary.

After amplification, the voice signal is applied, through the INT-AUDIO common 50 ohm output, to the other audio selector panels, and then to the reception systems (boomset, loudspeaker).
The crew member(s) concerned may answer using his microphone and operating his PTT switch. Reception is the same as above.

As the Second Supernumerary is not provided with an audio selector panel, his equipment is directly connected to the interphone amplifier:

- He uses the "Flight Microphone 5" input for transmission. (This input is connected to the interphone box lower jack on the nose gear leg).
- The reception output is connected to reception output on the Flight Engineer's audio selector panel.

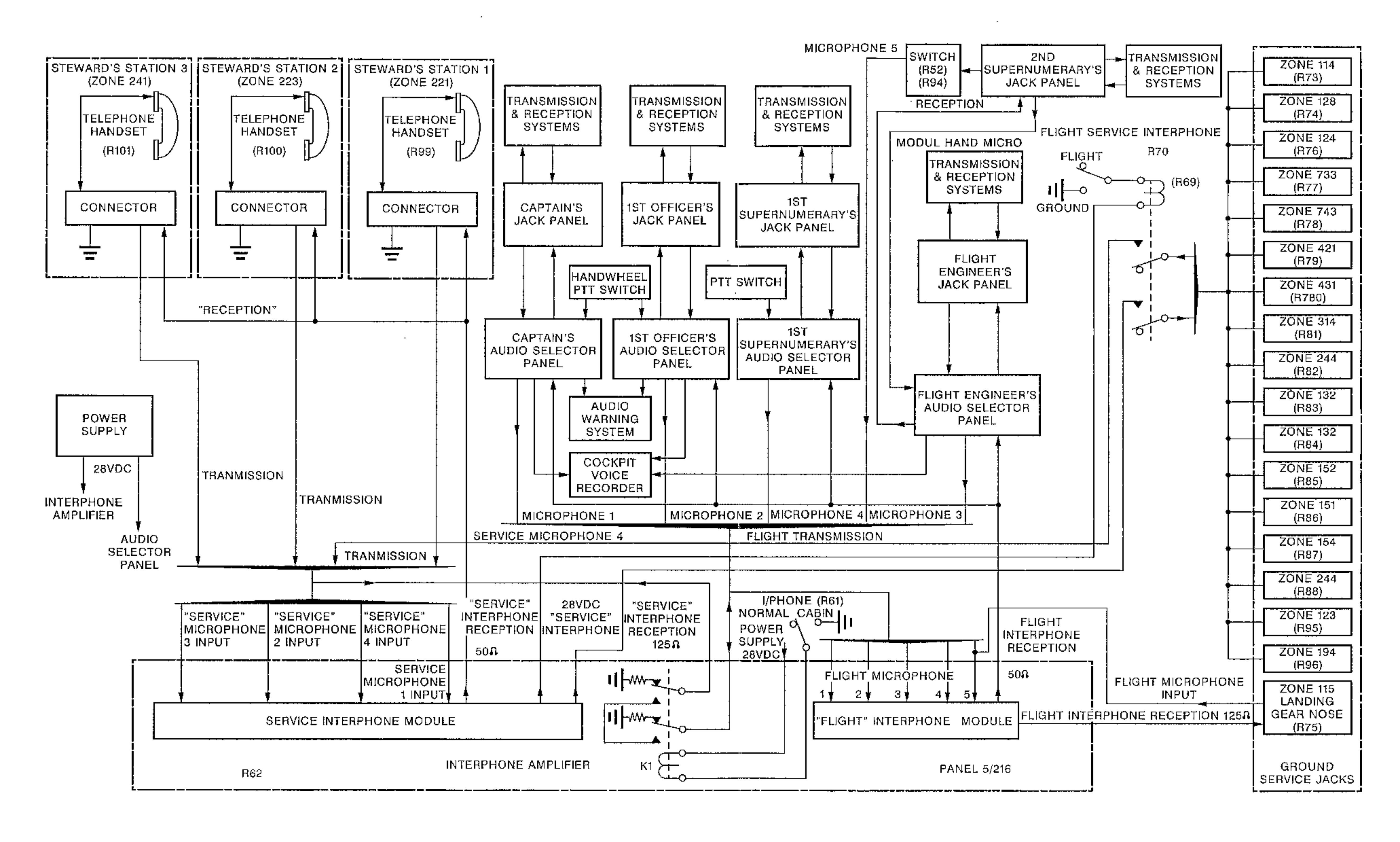
He speaks in his oxygen mask microphone or his boomset microphone with BOOM-MASK switch (R94) placed in the appropriate position and ON-OFF PTT switch in ON position. The voice signal is applied to the "Flight Microphone 5" input.

Ground personnel may have direct communication with the crew members, through the lower ground service jack on the nose gear leg, connected to the Flight Microphone 5 input. A warning light and a horn allow crew members to call the ground mechanic who, in turn, has possibility of actuating a call light in the flight compartment (Ref. 23-42-00, Description and Operation).

Reception through the lower ground service jack on the nose gear leg interphone box (R75), is directly obtained from the 125 ohm reception output of the interphone amplifier (R62).

(4) Voice communication associated with public address function

The public address amplifier is energized when one of the four crew members has engaged the PA key on his audio selector panel, speaking through his boomset or oxygen mask microphone, or through his hand microphone, and engaging his PTT switch.
Thus, the crew member will be able to make announcements through Steward Station or passenger compartment loudspeakers.



Interphone: Operation in the SERVICE Mode
Figure 021

(5) Voice communication in SERVICE (cabin) function

In this mode, the I/PHONE NORMAL - CABIN switch (R61), on panel 4-211, is placed in the CABIN position. Relay K1 in the interphone amplifier is energized. This results in:

- both the FLIGHT and SERVICE load resistors being eliminated,
- K1 connecting the transmission circuit either to the FLIGHT module or to the SERVICE module.

The crew members will use the interphone function via their respective audio selector panels.

(a) Intercommunication between crew members, ground personnel (nose gear leg jack) and Stewards.

When a crew member speaks into his microphone, while operating his PTT switch, the audio frequency signal from the microphone is applied to the interphone amplifier R62.
The voice signal is applied:

- directly to the FLIGHT module
- through switch (R61) to the SERVICE module.

(a1) Communication using (FLIGHT function) jack on nose gear leg

NOTE: The jacks installed on interphone box are mounted in parallel. The lower or upper jack will be used depending on the type of ground equipment to be connected.

After being warned by means of a ground call, the ground personnel may communicate with the crew, using a jack.
Voice communication from either the crew or the ground personnel is thus applied to the FLIGHT module. Communication is carried out in the same manner as it is in the interphone function.

(a2) Communication using (Service function) jack on nose gear leg

The ground personnel or the crew are warned that a communication is to be established, by means of the ground call (Ref. 23-41-00). Voice signal from the audio selector panels voice communication from flight microphone 1 to flight microphone 4 is applied by energizing relay K1 on the SERVICE module. After being amplified, the audio frequency signal is supplied to the nose gear leg interphone box (R75), through the 125 ohm Flight Interphone Reception output.
Each ground personnel member answers using his microphone, the audio frequency signal is thus applied to the FLIGHT module, through the Service microphone 4 input and relay K1. The audio frequency signal is them amplified and fed to the crew members' reception system, through the 50 ohm Flight Interphone Reception output and the audio selector panels.

(a3) Communication with Stewards' stations

Voice signal from the audio selector panel in use is applied to the SERVICE interphone module through relay K1.
After being amplified, the audio frequency signal is applied to the three Stewards' stations through the 50 ohm Service Interphone Reception output.
If a Steward has taken hold of either one of the three telephone handsets, he will be able to listen to the call.
If the above Steward wishes to answer, he must speak into his telephone handset. Thus, the audio frequency signal is applied to the FLIGHT module through relay K1. After being amplified, the signal is applied to the crew members' reception systems through the 50 ohm Flight Interphone Reception output and the audio selector panels.

(b) Communication between crew members' stations and ground service jacks.

With the SERVICE I/PHONE FLIGHT-GROUND switch (R70) placed in the GROUND position, relay (R69) is energized, thus connecting the ground service jacks to interphone amplifier (R62), through the service interphone 4 input line for transmission, and the 125 ohm service interphone reception line for reception.
When a crew member speaks into his microphone, the audio frequency signal is applied to interphone amplifier (R62). From the amplifier output, it is fed both to:

- The FLIGHT module, which amplifies it and applies the resulting signal to the nose gear leg jack, through the 125 ohm flight interphone reception output.
- The SERVICE module, through relay K1. After being amplified this signal is fed to any one of the jacks through the 125 ohm SERVICE interphone reception output.

NOTE: Communication with the nose gear leg interphone box (R75) jacks is not submitted to switch (R70).

To answer, the ground personnel member must speak into his microphone connected to any service jack. The audio frequency signal is thus applied to the FLIGHT module, through the service interphone 4 input line and relay K1 (K1 energized) on FLIGHT module of interphone amplifier (R62). The amplified signal is then applied to the crew members' reception systems.

(c) Communication from Stewards' stations

Steward station telephone handsets are connected to interphone amplifier (R62), which feeds the audio frequency transmission signals to the "Service amplifier" as follows:

- Steward's station 1 : Transmission on Service Input 1
- Steward's station 2 : Transmission on Service Input 2
- Steward's station 3 : Transmission on Service Input 3
- All stations : Reception on 50 ohm Interphone output.

When a communication is established with the crew members, the voice signal from a telephone handset is applied to the FLIGHT module through relay K1 of interphone amplifier (R62).

(c1) Call from one Stewards' station to another

Communication between two Stewards requires each of them holding his own telephone handset.
Both must press the integral PTT switch before speaking.

(c2) Call from one Steward's station to a crew member

If a Steward wishes to establish communication with a crew member, he must take hold of his telephone handset and speak into it.
Communication with one or several crew members is possible only if the I/PHONE NORMAL - CABIN switch (R61) is placed in CABIN position, so as to apply the telephone handset voice signal to the FLIGHT module.

(c3) Communication between a Stewards' station and the nose gear leg service jack

Communication is achieved using the telephone handset. The voice signal is applied to the SERVICE module.
It is amplified and fed to one jack of interphone box (R75), through the 125 ohm Flight interphone reception output.
The ground personnel must answer, speaking into their microphone. The audio frequency signal is thus applied to Flight Microphone 5 input line. After being amplified in the SERVICE module, the signal is applied to the three Stewards' stations, through the 50 ohm service interphone reception output.

(c4) Communication between a Stewards' station and the ground service jacks

With the SERVICE I/PHONE FLIGHT-GROUND switch (R70) placed in the GROUND position, relay (R69) is energized, thus connecting the ground service jacks to the service amplifier.

The transmission and reception processes are identical with transmission and reception in the case of communication with the service jack. Communication with the nose gear leg jack is not submitted to switch (R70).

D. Additional Outputs

(1) Flight recorder (AIDS)

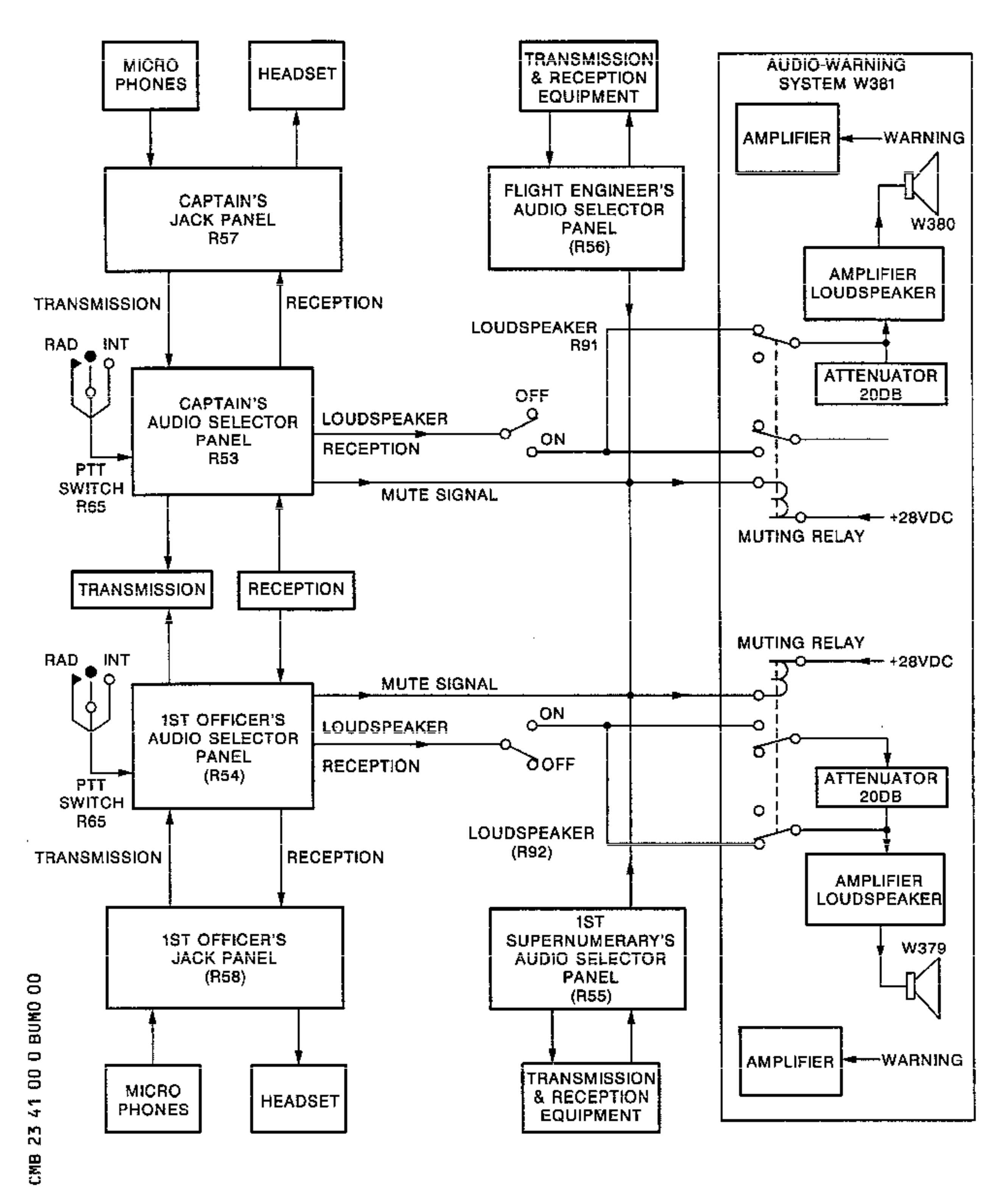
The Captain's and First Officer's PTT signals are fed to and recorded in the flight recorder.

(2) Selcal

Signals from the VHF1, VHF2, HF1, HF2 PTT switch lines are applied to the SELCAL system, in order to avoid the decoder receiving a signal while the HF or VHF systems are transmitting.

R (3) Audio Warning System (Ref. Fig. 022)

Signals received at Captain's or First Officer's audio selector panels are applied to the audio warning loudspeakers.
On Captain's or First Officer's console (1-211 or 1-212), LOUDSPEAKER ON-OFF switch is placed in ON position. The audio frequency transmission signal from Captain's or First Officer's audio selector panel is applied to the amplifier of the audio warning channel concerned, through the muting relay contacts (relay de-energized). The amplified audio frequency signal is fed to the loudspeaker.
If one or both LOUDSPEAKER ON-OFF switches (R91-R92) is (are) in ON position while a voice signal is being applied to HF or VHF transmitter, interphone or public address amplifier, the muting relays of both channels are energized by the mute signal generated by action on PTT switch of either of the four channels (Captain's, First Officer's, Flight Engineer's or First Supernumerary's).
The energized relays connect on both audio warning loudspeaker lines a 20 dB attenuator for muting the loudspeakers. If switches (R91-R92) are in OFF position when speaking, the audio signal is not fed to the audio warning loudspeaker amplifiers but the muting relays are energized.



Interphone: Interconnection With Audio Warning System
Figure 022

R

After SB 23-026 For A/C 001-007,

R (3) Audio Warning System (Ref. Fig. 023)

(a) Normal operation

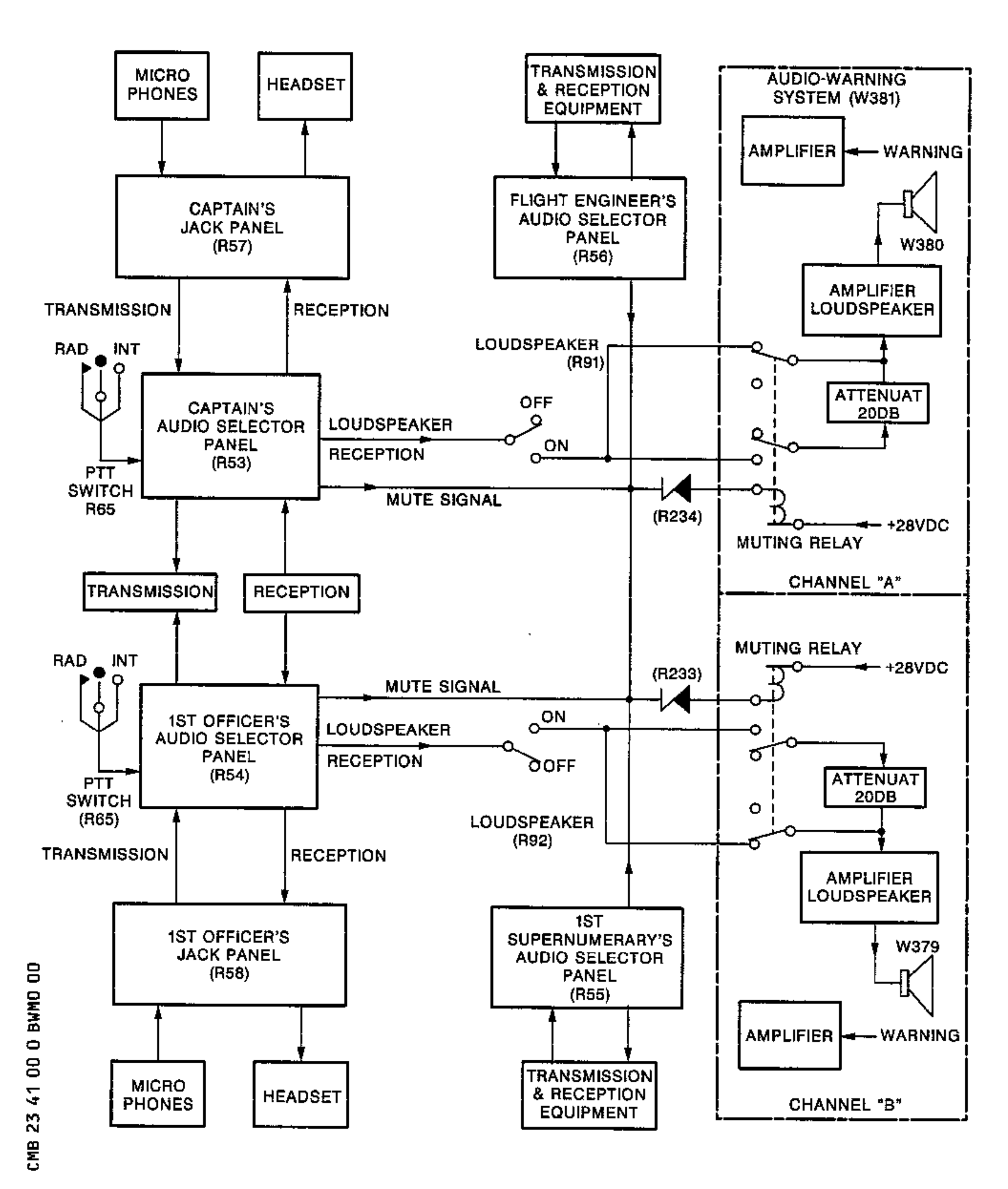
Signals received at Captain's or First Officer's audio selector panels are applied to the audio warning loudspeakers.
On Captain's or First Officer's console (1-211 or 1-212), LOUDSPEAKER ON-OFF switch is placed in ON position. The audio frequency transmission signal from Captain's or First Officer's audio selector panel is applied to the amplifier of the audio warning channel concerned, through the muting relay contacts (relay de-energized). The amplified audio frequency signal is fed to the loudspeaker. (Audio level output to maximum).

(b) Attenuation operation

If one or both LOUDSPEAKER ON-OFF switches (R91-R92) is (are) in ON position while a voice signal is being applied to HF or VHF transmitter, interphone or public address amplifier, the muting relays of both channels are energized by the mute signal generated by action on PTT switch of either of the four channels (Captain's, First Officer's, Flight Engineer's or First Supernumerary's).
The energized relays connect on both audio warning loudspeaker lines a 20 dB attenuator for muting the loudspeakers. If switches (R91-R92) are in OFF position when speaking, the audio signal is not fed to the audio warning loudspeaker amplifiers but the muting relays are energized.

(c) Automatic Attenuation

If Audio Warning System "Channel A" 28 volt power supply is inhibited (or failed), a cross-feed from "Channel B" 28 volt power supply via the interphone muting relay coils and blocking diodes will partially energize the pre-amplifier of "Channel A" and pass a reduced selcal audio tone signal to the main amplifiers/loudspeakers.
(Audio level output is reduced from 33/30 dB to 20/10 dB).



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Interphone: Interconnection with Audio Warning System
Figure 023

R (4) Cockpit Voice Recorder (Ref. Fig. 024)

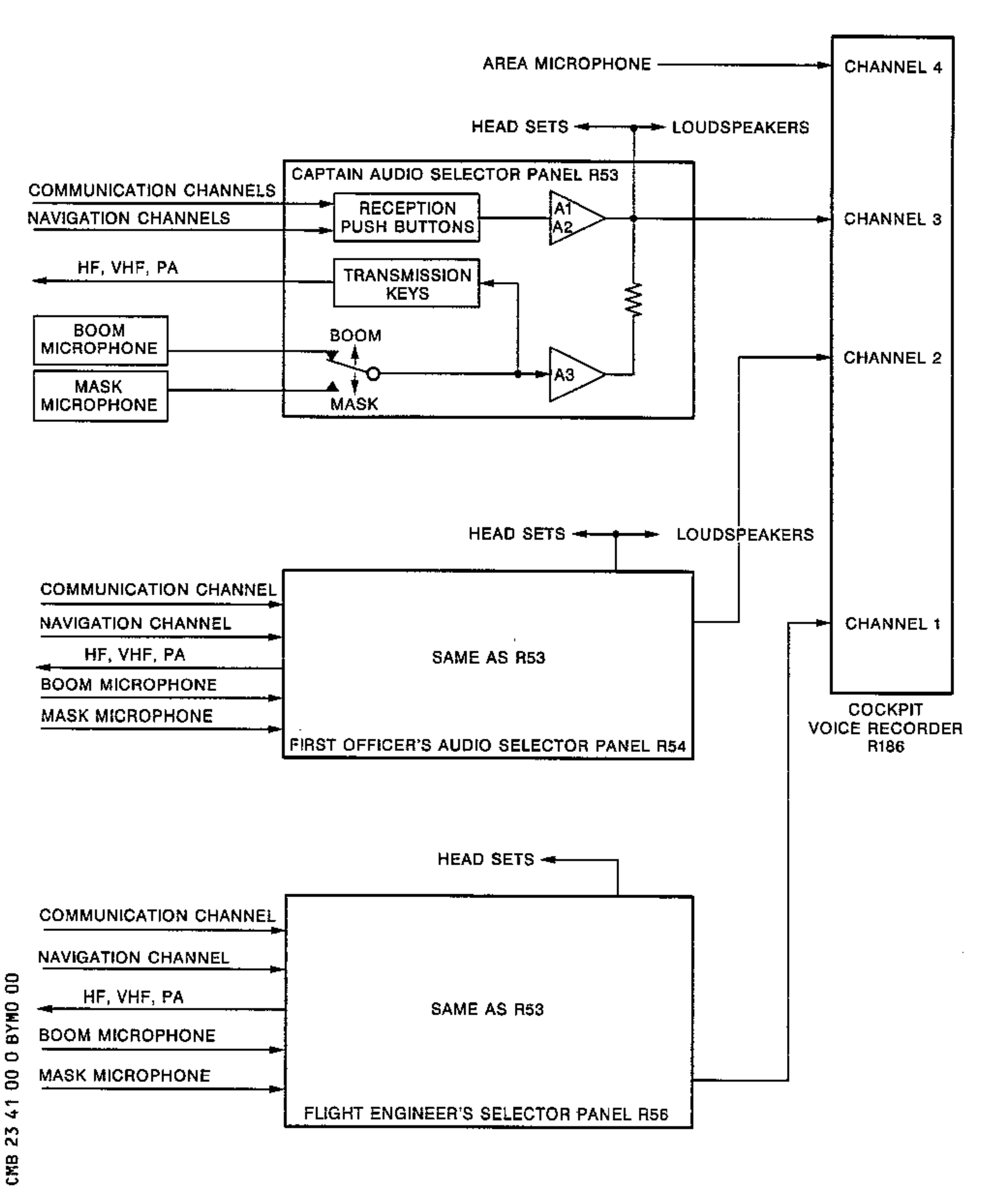
(a) Reception signal from communication or navigation Channel is applied to amplifiers A1, A2 which send the audio output signal towards:

- the audio warning loudspeakers
- the headset
- one channel of the cockpit voice recorder.

(b) The voice signal from mask or boomset microphone is applied to BOOM-MASK switch on the audio selector panel. After selection of either microphone channel, the signal is sent to amplifier A3 input. The output of this amplifier is applied to the audio output via the link resistor.

(c) The audio or microphone output of the audio selector panel is applied to the cockpit voice recorder:

- Channel 3 for Captain's line
- Channel 2 for First Officer's line
- Channel 1 for Flight Engineer's line.



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Interphone: Interconnection with Cockpit Voice Recorder
Figure 024

INTERPHONE - TROUBLE SHOOTING

1. General

The following trouble shooting procedures are intended to enable faults found in the interphone system to be quickly rectified.
The defects can be isolated with the aid of trouble shooting procedures (Ref. Para. 3) and traced through OK and NOT OK to the appropriate charts or other specified rectification action as may be required. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.
Bracheted numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information including component location required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

A. Equipment and Materials

DESCRIPTION	PART NO.
5 Boomsets	Aircraft Equipment
5 Oxygen Masks	Aircraft Equipment
From Test Set - 2 Boomsets - 2 Ground Telephones/Headsets - 2 Boomset Adapters	

B. Make certain that the following RAD-INT PTT switches are placed in intermediate position on :

(1) Captain's and First Officer's control column handwheels.

(2) First Supernumerary's panel 3-213.

(3) Second Supernumerary's panel 20-215.

C. On Flight Engineer's panel 29-214, make certain that SERVICE I/PHONE-GROUND switch is in FLIGHT position.

D. On Second Supernumerary's panel 20-215, make certain that BOOM-MASK switch is in BOOM position.

E. On Captain's, First Officer's, Flight Engineer's and First Supernumerary's panels, make certain that :

(1) All transmission keys are disengaged on keyboard

(2) All reception push-buttons are disengaged.

(3) INT-R/T PTT switch is in intermediate position.

(4) BOOM-MASK switch is in BOOM position.

(5) VOICE filter push-button is disengaged.

F. On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels, make certain :

(1) Boomset (aircraft equipment) is connected to HEADSET and MIC jacks.

G. On Captain's console 1-211 and First Officer's console 1-212, make certain that LOUDSPEAKER switch is in OFF position.

H. At Stewards' stations (zone 221, 223, 241) make certain that boomsets (aircraft equipment) are connected to relevant jacks.

I. At overhead panel 4-211 make certain that NORMAL-CABIN switch is in NORMAL position.

J. In zone 216, remove panels allowing access to shelves of RH forward electronics rack.

K. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

L. Operate electronics rack ventilation (Ref. 21-21-00).

M. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
AUDIO WARN SYS SUP 1		W 371	M21
No.2 INPH SUP	3-213	R 90	H 2
AUDIO WARN SYS SUP 2	5-213	W 372	C17
LH CONSOLE INST LTS SUP	14-215	L 374	B11
3CM LH INST LTS SUP	13-216	L 377	E 8
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
RH CONSOLE INST LTS SUP		L 373	E 8

N. Place the following control knobs in ON position :

(1) LH CONSOLE on Captain's console 1-211.

(2) RH CONSOLE on First Officer's console 1-212

(3) LIGHT CONTROL on First Supernumerary's panel 3-213.

O. Turn clockwise the following light control knobs :

(1) LIGHTING CENTRE CONSOLE PANEL on centre instrument panel 4-211.

(2) LIGHTING PANEL on Flight Engineer's panel 11-214.

3. Trouble Shooting

```
*****************************************************
* Voice communication using boomset                 *
*                                                   *
* 1. On audio selector panels [1], [2], [3] and [4]:*
*     - engage INT reception push-button and adjust *
*       integral potentiometer to intermediate posi- *
*       tion                                        *
*     - make certain that BOOM-MASK switch is in BOOM*
*       position                                    *
*     - place INT-R/T PTT switch in INT position.   *
*                                                   *
* 2. Establish voice communication between the      *
*    various crew members' stations (by pairs) and  *
*    check quality of the communication.            *
*****************************************************
    ||        |
    ||        |         ------------------------------------------------
    ||        |        | No modulation, no reception at any station.   |
    OK      NOT OK---| Trip circuit breakers [5] and [6].             |
    ||        |        | Replace interphone amplifier [7].              |
    ||        |         ------------------------------------------------
    ||        |
    ||        |         ------------------------------------------------
    ||        |        | No modulation at one crew member's station     |
    OK      NOT OK---| but correct reception. Ref Chart 101.          |
    ||        |         ------------------------------------------------
    ||        |
    ||        |         ------------------------------------------------
    ||        |        | No reception at Captain's or First Officer's  |
    OK      NOT OK---| station but correct modulation. Ref Chart 102|
    ||        |         ------------------------------------------------
    ||        |
    ||        |         ------------------------------------------------
    ||        |        | No reception at Flight Engineer's or First     |
    OK      NOT OK---| Supernumerary's station but correct modula-   |
    ||                 | tion. Ref Chart 103.                            |
    ||                  ------------------------------------------------
    ||
    ||
```

```
    ||
    ||
******************************************************
* Voice communication using oxygen mask              *
*                                                    *
* 1. On audio selector panels [1], [2], [3] and [4]:*
*     - Place BOOM-MASK switch in MASK position      *
*     - Check that INT-R/T PTT switch is in INT      *
*       position.                                    *
*                                                    *
* 2. Check reception in boomset                      *
*                                                    *
* 3. Establish voice communication between the       *
*    various crew members' stations (by pairs) and   *
*    check quality of the communication.             *
******************************************************
    ||      |
    ||      |      ------------------------------------------------
    ||      |      | No modulation through oxygen mask microphone.|
    OK      NOT OK---| Ref Chart 104.                             |
    ||             ------------------------------------------------
    ||
******************************************************
* Voice communication between Captain and First      *
* Officer using PTT switches on control columns and *
* using boomsets.                                    *
*                                                    *
* 1. On audio selector panels [1] and [2] :          *
*     - place BOOM-MASK switch in BOOM position      *
*     - place INT-R/T PTT switch in intermediate     *
*       position.                                    *
*                                                    *
* 2. On control column handwheels, place PTT switch *
*     [12] and [13] in INT position.                 *
*                                                    *
* 3. Establish communication between the two sta-    *
*     tions and check quality of the communication.  *
******************************************************
    ||      |
    ||      |      ------------------------------------------------
    ||      |      | No modulation at Captain's or First Officer's|
    OK      NOT OK---| station. Ref Chart 105.                    |
    ||      |      ------------------------------------------------
    ||      |
    ||      |      ------------------------------------------------
    OK      NOT OK---| No modulation at both stations. Ref Chart 106|
    ||             ------------------------------------------------
    ||
    ||
```

```
    ||
    ||
*****************************************************
* Voice communication from First Supernumerary's    *
* station using external PTT switch and boomset.    *
*                                                   *
* 1. On audio selector panel [4] :                  *
*      - place BOOM-MASK switch in BOOM position    *
*      - place INT-R/T PTT switch in intermediate   *
*        position                                   *
*                                                   *
* 2. At First Supernumerary's station, on panel     *
*    3-213, place PTT switch [15] in INT position.  *
*                                                   *
* 3. Establish voice communication with Captain's   *
*    or First Officer's station and check quality   *
*    of the communication.                          *
*****************************************************
    ||      |
    ||      |     -------------------------------------------------
    ||      |     | No modulation from First Supernumerary's sta-|
    OK      NOT OK---| tion. Ref Chart 107.                      |
    ||      |     -------------------------------------------------
    ||      |
    ||      |
*****************************************************
* Reception in audio warning loudspeakers           *
*                                                   *
* 1. On Captain's or First Officer's console, place *
*    LOUDSPEAKER switch in ON position.             *
*                                                   *
* 2. On audio selector panels [1] and [2] :         *
*      - place BOOM-MASK switch in BOOM position    *
*      - place INT-R/T PTT switch in intermediate   *
*        position                                   *
*                                                   *
* 3. Place PTT switches on control column handwheels*
*    in INT position.                               *
*                                                   *
* 4. Modulate boomset microphones and check recep-  *
*    tion in loudspeakers                           *
*****************************************************
    ||      |
    ||      |     -------------------------------------------------
    OK      NOT OK---| No sidetone, no reception on one loudspeaker |
    ||            | channel. Ref Chart 108.                      |
    ||            -------------------------------------------------
    ||
    ||
```

```
||        |
||        |         ----------------------------------------------
||        |        | No sidetone on one loudspeaker channel but   |
||        |        | correct reception.                           |
OK        NOT OK---| Trip circuit breakers [18] and [19].         |
||        |        | Replace audio warning unit [20].             |
||        |         ----------------------------------------------
||        |
||        |
||        |         ----------------------------------------------
||        |        | No sidetone on one audio warning channel.    |
OK        NOT OK---| Ref Chart 109.                               |
||        |         ----------------------------------------------
||        |
||        |
||        |
||        |         ----------------------------------------------
||        |        | Impossibility to stop operation of Captain's |
OK        NOT OK---| or First Officer's loudspeaker.              |
||                 | Replace LOUDSPEAKER switch [16] or [17].     |
||                  ----------------------------------------------
||
***************************************************
* Voice communication with interphone box on nose *
* gear                                            *
*                                                 *
* 1. On interphone box [21], connect a ground tele-*
*    phone to one of the jacks.                   *
*                                                 *
* 2. On audio selector panels [1], [2], [3] and [4]:*
*    - place INT-R/T PTT switch in INT position   *
*    - place BOOM-MASK switch in BOOM position.   *
*                                                 *
* 3. On control column handwheels and on First    *
*    Supernumerary's panel, place RAD-INT PTT switch*
*    in intermediate position.                    *
*                                                 *
* 4. On Captain's and First Officer's consoles,   *
*    place LOUDSPEAKER switch in OFF position.    *
*                                                 *
* 5. Modulate boomset at one crew member's station *
*    and check communication between crew member *
*    and ground personnel.                        *
***************************************************
||        |
||        |         ----------------------------------------------
||        |        | No modulation from interphone box.           |
OK        NOT OK---| Ref Chart 110.                               |
||                  ----------------------------------------------
||
||
||
```

```
    ||       |
    ||       |
    ||       |        -----------------------------------------------
    OK       NOT OK---| No reception at nose gear interphone box.   |
    ||                | Ref Chart 111.                              |
    ||                -----------------------------------------------
    ||
*****************************************************
* Voice communication between Second Supernumerary  *
* and a crew member using boomset.                  *
*                                                   *
* 1. At Second Supernumerary's panel, place :       *
*     - BOOM-MASK switch in BOOM position           *
*     - RAD-INT PTT switch in INT position.         *
*                                                   *
* 2. Modulate boomset microphone at Second Super-   *
*    numerary's and crew member's stations and      *
*    check communication.                           *
*****************************************************
    ||       |
    ||       |        -----------------------------------------------
    OK       NOT OK---| No modulation from Second Supernumerary's   |
    ||       |        | station. Ref Chart 112.                     |
    ||       |        -----------------------------------------------
    ||       |
    ||       |        -----------------------------------------------
    ||       |        | No reception at Second Supernumerary's sta- |
    OK       NOT OK---| tion. Ref Chart 113.                        |
    ||                -----------------------------------------------

    ||
*****************************************************
* Voice  communication between Second Supernumerary *
* and a crew member using oxygen mask.              *
*                                                   *
* 1. On second Supernumerary's  panel, place :      *
*     - BOOM-MASK switch in MASK position           *
*                                                   *
* 2. Modulate Second Supernumerary's oxygen mask    *
*    microphone and check reception at crew member's*
*    station chosen.                                *
*****************************************************
    ||       |
    ||       |        -----------------------------------------------
    ||       |        | No modulation through oxygen mask microphone |
    OK       NOT OK---| Replace oxygen mask microphone.              |
    ||                | Ref 35-12-12, Removal/Installation.          |
    ||                -----------------------------------------------
    ||
    ||
```

```
    ||
*****************************************************
* Voice communication between Stewards' stations.   *
*                                                   *
* 1. Pick up boomset                                *
*                                                   *
* 2. Establish communication between Stewards' sta- *
*    tions (by pairs) and check quality of the com- *
*    munication :                                   *
*    - modulation through boomset, PTT switch held  *
*      pressed                                      *
*    - reception with PTT switch released.          *
*****************************************************
    ||      |
    ||      |      ----------------------------------------------
    ||      |      | No modulation, no reception at the three    |
    OK      NOT OK---| Stewards' stations.                       |
    ||      |      | Trip circuit breakers [5] and [6].          |
    ||      |      | Replace interphone amplifier [7].           |
    ||      |      ----------------------------------------------
    ||      |
    ||      |      ----------------------------------------------
    ||      |      | No modification at one Steward's station.   |
    OK      NOT OK---| Ref Chart 114.                            |
    ||      |      ----------------------------------------------
    ||      |
    ||      |      ----------------------------------------------
    ||      |      | No reception at one Steward's station       |
    OK      NOT OK---| Ref Chart 115.                            |
    ||             ----------------------------------------------
    ||
*****************************************************
* Voice communication between a Steward's station   *
* and a crew member's station.                      *
*                                                   *
* 1. On overhead panel 14-211, place I/PHONE CABIN- *
*    NORMAL switch in CABIN position.               *
*                                                   *
* 2. On audio selector panels [1], [2], [3] and [4],*
*    check that :                                   *
*    - BOOM-MASK switch is in MASK position         *
*    - INT-R/T PTT switch is in INT position        *
*    - INT reception push-button is engaged and in- *
*      tegral potentiometer in intermediate position*
*                                                   *
* 3. At Steward's station, check quality of the com-*
*    munication with crew member using boomset.     *
*****************************************************
    ||      |
    ||      |
```

```
    ||      |
    ||      |    ------------------------------------------------
    OK      NOT OK---| No communication between the two stations. |
    ||               | Ref Chart 116.                             |
    ||               ------------------------------------------------
    ||
*****************************************************
* Voice communication between a ground service jack *
* and nose gear interphone box.                     *
*                                                   *
* 1. Connect a ground telephone to one of the jacks *
*    on interphone box                              *
*                                                   *
* 2. Connect ground telephone to one ground ser-    *
*    vice jack                                      *
*                                                   *
* 3. At Flight Engineer's station, place SERVICE-   *
*    I/PHONE switch in GROUND position.             *
*                                                   *
* 4. Check quality of the communication             *
*****************************************************
    ||      |
    ||      |    ------------------------------------------------
    ||      |    | No modulation, no reception at the ground    |
    OK      NOT OK---| service jack. Ref Chart 117.             |
    ||      |    ------------------------------------------------
    ||      |
    ||      |    ------------------------------------------------
    ||      |    | No modulation, no reception at the ground    |
    OK      NOT OK---| service jack. Ref Chart 118.             |
    ||           ------------------------------------------------
    ||
*****************************************************
* Trip circuit breaker [5].                         *
* Using boomset, establish communication between    *
* Captain's and First Officer's stations.           *
* On audio selector panels [1] and [2], check that :*
* - INT-R/T PTT switch is in INT position.          *
* - BOOM-MASK switch is in BOOM position.           *
* Check quality of the communication between the    *
* two stations.                                     *
*****************************************************
    ||      |
    ||      |    ------------------------------------------------
    OK      NOT OK---| No voice communication. Ref Chart 119.   |
    ||           ------------------------------------------------
    ||
    ||
    ||
    ||
```

```
    ||
    ||
**************************************************
* Reset circuit breaker [5].                     *
* Trip circuit breaker [6].                      *
* Using boomset, establish communication between *
* Captain's and First Officer's stations.        *
* Check quality of the communication.            *
**************************************************
    ||     |
    ||     |         ------------------------------------------------
    OK     NOT OK---| No voice communication. Ref Chart 120.        |
    ||               ------------------------------------------------
    ||
    ||
**************************************************
* CAUTION : AS THE FOLLOWING OPERATION IS TO BE PER-*
*           FORMED WITH AC AND DC BUSBARS DISCON-  *
*           NECTED AND ONLY GROUND BUSBAR ENERGIZED,*
*           MAKE CERTAIN THAT IT DOES NOT INTEFERE *
*           WITH OTHER TESTS IN PROGRESS.          *
*                                                  *
* On Flight Engineer's panel 3-214, place GRD PWR  *
* CONTROL switch in TRIP position.                 *
* GRND PWR AVAILABLE indicator light illuminates.  *
* Reset circuit breaker [46].                      *
* Check quality of the communication between Captain*
* and First Officer's stations.                    *
**************************************************
    ||     |
    ||     |         ------------------------------------------------
    OK     NOT OK---| No voice communication. Ref Chart 121.        |
    ||               ------------------------------------------------
    ||
**************************************************
* On Flight Engineer's panel 3-214, replace GRD PWR *
* CONTROL switch in CLOSE position.                *
* Reset circuit breaker [6].                       *
* The interphone system is operational.            *
**************************************************
```

```
**************************************
* NO MODULATION AT ONE CREW MEMBER'S *
* STATION BUT CORRECT RECEPTION.     *
**************************************

*****************************************************
* 1. On audio selector panel of faulty crew member's*
*    station :                                      *
*    - place BOOM-MASK switch in MASK position      *
* 2. Modulate oxygen mask microphone. Communication *
*    is correct.                                    *
*****************************************************
    |       |    ------------------------------------------------
    |       |    | Replace boomset at jack panel of faulty sta- |
    NO     YES---| tion. Repeat modulation.                     |
    |            ------------------------------------------------
    |                                  |
    |                               NOT OK
    |                                  |
    |            ------------------------------------------------
    |            | Replace faulty jack panel [8], [9], [10] or  |
    |            | [11].                                        |
    |            ------------------------------------------------
    |
*****************************************************
* Trip circuit breakers [5] and [6].                *
* Replace faulty audio selector panel [1], [2], [3] *
* or [4].                                           *
*****************************************************
```

Chart 101

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```
**************************************
* NO RECEPTION AT CAPTAIN'S OR FIRST *
* OFFICER'S STATION BUT CORRECT MO-  *
* DULATION.                          *
**************************************

*****************************************************
* On Captain's console 1-211 or on First Officer's  *
* console 1-212, place LOUDSPEAKER switch in ON     *
* position. Reception in audio warning loudspeakers.*
*****************************************************
    |      |
    |      |      ------------------------------------------------
    |      |      | On jack panel [8] or [9], replace faulty     |
    NO     YES----| boomset.                                     |
    |             ------------------------------------------------
    |                                     |
    |                                  NOT OK
    |                                     |
    |             ------------------------------------------------
    |             | Replace faulty jack panel [8] or [9].        |
    |             ------------------------------------------------
    |
*****************************************************
* Trip circuit breakers [5] and [6].                *
* Replace faulty audio selector panel [1] or [2].   *
*****************************************************
```

Chart 102

```
**************************************
* NO RECEPTION AT FLIGHT ENGINEER'S  *
* OR FIRST SUPERNUMERARY'S STATION   *
* BUT CORRECT MODULATION.            *
**************************************

*****************************************************
* Replace boomset jack panel [10] or [11].          *
*****************************************************
           |
           |
           |         ------------------------------------------------
           |         | Trip circuit breakers [5] and [6].           |
NOT OK---| Replace faulty audio selector panel [3] or   |
                     | [4].                                         |
                     ------------------------------------------------
                                          |
                                          |
                                       NOT OK
                                          |
                     ------------------------------------------------
                     | Replace faulty jack panel [10] or [11].      |
                     ------------------------------------------------
```

Chart 103

```
**************************************
* NO MODULATION THROUGH OXYGEN MASK  *
* MICROPHONE.                        *
**************************************

*****************************************************
* Replace faulty oxygen mask microphone.            *
* Ref. 35-12-12, Removal/Installation.              *
*****************************************************
           |
           |
           |         ------------------------------------------------
           |        | Trip circuit breakers [5] and [6].             |
     NOT OK---| Replace faulty audio selector panel [1], [2],|
                    | [3] or [4].                                    |
                     ------------------------------------------------
```

Chart 104

```
**************************************
* NO MODULATION AT CAPTAIN'S OR FIRST*
* OFFICER'S STATION.                 *
**************************************

*****************************************************
* Trip circuit breakers [5] and [6].                *
* Replace faulty audio selector panel [1] or [2].   *
*****************************************************
                         |
                         |
                      NOT OK
                         |
*****************************************************
* Replace PTT switch [12] or [13] on Captain's or   *
* First Officer's control column handwheel.         *
*****************************************************
```

Chart 105

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```
*************************************-------------------------------
* NO MODULATION AT BOTH STATIONS.   *| GROUND EQUIPMENT REQUIRED  |
*************************************-------------------------------
                                     | DESCRIPTION       PART NO. |
                                     -------------------------------
                                     | MULTIMETER                 |
                                     -------------------------------

*****************************************************
* Check 28VDC at output of circuit breaker [5].     *
*****************************************************
    |      |
    |      |
    |      |      ------------------------------------------------
 NOT OK    OK-------| Trip circuit breaker [5].                   |
    |               | On shelf 5-216, replace relay [14].         |
    |               ------------------------------------------------
    |
*****************************************************
* Replace circuit breaker [5].                      *
*****************************************************
```

Chart 106

```
****************************************----------------------------------
* NO MODULATION FROM FIRST SUPERNUME-*| GROUND EQUIPMENT REQUIRED     |
* RARY'S STATION.                    *----------------------------------
**************************************| DESCRIPTION          PART NO. |
                                      ----------------------------------
                                      | MULTIMETER                     |
                                      ----------------------------------

*****************************************************
* Trip circuit breakers [5] and [6].                *
* Replace audio selector panel [4].                 *
*****************************************************
           |
           |
           |       ------------------------------------------------
   NOT OK------| On First Supernumerary's panel 3-213, check   |
               | switch [15].                                   |
               ------------------------------------------------
                     |                        |
                     |                        |
                     OK                    NOT OK
                     |                        |
                     |                        |
---------------------------------  ----------------------------------
| Replace switch [15].          |  | Check circuit. Ref WDM 23-51-11|
---------------------------------  ----------------------------------
```

Chart 107

```
*************************************-------------------------------
* NO SIDETONE, NO RECEPTION ON ONE   *| GROUND EQUIPMENT REQUIRED  |
* LOUDSPEAKER CHANNEL.               *-------------------------------
**************************************| DESCRIPTION       PART NO. |
                                      -------------------------------
                                      | MULTIMETER                 |
                                      -------------------------------

*****************************************************
* On Captain's or First Officer's console,          *
* check LOUDSPEAKER switch.                         *
*****************************************************
     |      |
     |      |
     |      |           ------------------------------------------------
 NOT OK     OK-------| Ref 31-23-00, Trouble Shooting.                  |
     |                  ------------------------------------------------
     |
     |
-----------------------------------------------------
| Replace faulty switch [16] or [17].               |
-----------------------------------------------------
```

Chart 108

```
**************************************-------------------------------
* NO SIDETONE ON ONE AUDIO WARNING   *| GROUND EQUIPMENT REQUIRED  |
* CHANNEL                            *------------------------------
**************************************| DESCRIPTION        PART NO. |
                                      -------------------------------
                                      | MULTIMETER                  |
                                      -------------------------------

*****************************************************
* Trip circuit breaker [18] or [19].                *
* Replace audio warning unit [20].                  *
*****************************************************
          |
          |
          |      ------------------------------------------------
          |      | Trip circuit breakers [5] and [6].           |
       NOT OK---| Replace audio selector panel [7] or [2] at   |
                 | faulty station.                              |
                 ------------------------------------------------
                                  |
                               NOT OK
                                  |
                 ------------------------------------------------
                 | Check circuit. Ref WOM 23-51-11.             |
                 ------------------------------------------------
```

Chart 109

```
**************************************
* NO MODULATION FROM INTERPHONE BOX. *
**************************************

*****************************************************
* At second Supernumerary's panel 20-215, place     *
* the following controls :                          *
* - BOOM-MASK switch in BOOM position               *
* - RAD-INT PTT switch in INT position.             *
* Modulate boomset microphone and check reception   *
* in crew member's (Captain's) reception means.     *
*****************************************************
     |      |
     |      |
     |      |      ------------------------------------------------
     |      |      | Replace ground telephone connected to inter- |
 NOT OK    OK-------| phone box.                                   |
     |             ------------------------------------------------
     |                                     |
     |                                     |
     |                                  NOT OK
     |                                     |
     |                                     |
     |             ------------------------------------------------
     |             | Replace interphone box [21] on nose gear.    |
     |             ------------------------------------------------
     |
*****************************************************
* Trip circuit breakers [5] and [6].                *
* Replace interphone amplifier [7].                 *
*****************************************************
```

Chart 110

```
***************************************
* NO RECEPTION AT NOSE GEAR INTER-    *
* PHONE BOX.                          *
***************************************
*******************************************************
* Replace ground telephone on nose gear interphone   *
* box.                                                *
*******************************************************
           |
           |
           |      -----------------------------------------------
           NOT OK===| Replace interphone box [21] on nose gear.     |
                    -----------------------------------------------
                                        |
                                        |
                                      NOT OK
                                        |
                                        |
                    -----------------------------------------------
                    | Trip circuit breakers [5] and [6].            |
                    | Replace interphone amplifier [7].             |
                    -----------------------------------------------
```

Chart 111

```
**************************************
* NO MODULATION FROM SECOND SUPER-   *
* NUMERARY'S STATION.                *
**************************************

*****************************************************
* On second Supernumerary's panel 20-215, place     *
* BOOM-MASK switch in MASK position. Modulate       *
* oxygen mask microphone. Communication is correct. *
*****************************************************
    |      |
    |      |
    |      |      ------------------------------------------------
    |      |      | On Second Supernumerary's jack panel,        |
   NO     YES-----| replace boomset.                             |
    |             ------------------------------------------------
    |                                     |
    |                                     |
    |                                  NOT OK
    |                                     |
    |                                     |
    |             ------------------------------------------------
    |             | Replace jack panel [22].                     |
    |             ------------------------------------------------
    |
-----------------------------------------------------
| At Second Supernumerary's station, replace switch |
| [23].                                             |
-----------------------------------------------------
                          |
                          |
                       NOT OK
                          |
                          |
-----------------------------------------------------
| At Second Supernumerary's station, replace switch |
| [24].                                             |
-----------------------------------------------------
```

Chart 112

```
**************************************-------------------------------
* NO RECEPTION AT SECOND SUPERNUME-  *| GROUND EQUIPMENT REQUIRED  |
* RARY'S STATION.                    *-----------------------------
**************************************| DESCRIPTION        PART NO. |
                                      ------------------------------
                                      | MULTIMETER                  |
                                      ------------------------------

*****************************************************
* Replace boomset on Second Supernumerary's jack    *
* panel.                                            *
*****************************************************
          |
          |
          |          --------------------------------------------------
        NOT OK---| Replace jack panel [22].                          |
                     --------------------------------------------------
                                        |
                                        |
                                     NOT OK
                                        |
                                        |
                     --------------------------------------------------
                     | Check circuit. Ref WDM 23-51-11.               |
                     --------------------------------------------------
```

Chart 113

NO MODULATION AT ONE STEWARD'S STATION

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

Replace boomset.

NOT OK → Trip circuit breakers [5] and [6]. Replace interphone amplifier [7].

NOT OK → Check interphone circuit at Steward's station Ref WDM 23-41-11.

Chart 114

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```
*************************************----------------------------------
* NO RECEPTION AT ONE STEWARD'S     *| GROUND EQUIPMENT REQUIRED      |
* STATION                           *----------------------------------
*************************************| DESCRIPTION        PART NO.    |
                                     ----------------------------------
                                     | MULTIMETER                     |
                                     ----------------------------------

****************************************************
* Replace boomset.                                 *
****************************************************
                        |
                        |
                      NOT OK
                        |
                        |
****************************************************
* Check interphone circuit at Steward's station.   *
* Ref WDM 23-41-11.                                *
****************************************************
```

Chart 115

```
****************************************
* NO COMMUNICATION BETWEEN THE TWO     *
* STATIONS.                            *
****************************************

*****************************************************
* Trip circuit breakers [5] and [6].                *
* Replace interphone amplifier [7].                 *
*****************************************************
                        |
                        |
                     NOT OK
                        |
                        |
*****************************************************
* Replace switch [25].                              *
*****************************************************
```

Chart 116

```
*************************************----------------------------------
* NO MODULATION, NO RECEPTION AT THE *| GROUND EQUIPMENT REQUIRED     |
* GROUND SERVICE JACK.               *----------------------------------
**************************************|DESCRIPTION          PART NO. |
                                      ---------------------------------
                                      | MULTIMETER                    |
                                      ---------------------------------


****************************************************
* Repeat test from other ground service jack.      *
****************************************************
    |      |       ---------------------------------------------
    |      |       | Replace faulty ground service jack [26] to |
 NOT OK    OK------| [42].                                      |
    |              ---------------------------------------------
    |
****************************************************
* Trip circuit breakers [5] and [6].               *
* In RH electronics rack, on shelf 5-216, remove   *
* relay [43].                                      *
* Check presence of ground at pin "b" on relay base.*
****************************************************
    |      |
    |      |       ---------------------------------------------
    |      |       | Reset circuit breakers [5] and [6] and check |
 NOT OK    OK------| on base of relay [43] presence of 28VDC at   |
    |              | pin "a".                                     |
    |              ---------------------------------------------
    |                          |                      |
---------------------          |                      |
| Replace switch [44]. |     NOT OK                   OK
---------------------          |                      |
    |                          |                      |
    |      ------------------------------             |
 NOT OK----| Check circuit, Ref WDM 23-41-11|         |
           ------------------------------             |
                                                      |
                   ---------------------------------------------
                   | Trip circuit breakers [5] and [6].         |
                   | Replace relay [43].                        |
                   ---------------------------------------------
```

Chart 117

```
**************************************
* NO MODULATION OR RECEPTION AT THE  *
* GROUND SERVICE JACK                *
**************************************

*****************************************************
* Repeat test from other ground service jack.       *
*****************************************************
      |       |
      |       |     ------------------------------------------------
      |       |     | Replace faulty ground service jack [26] to   |
  NOT OK     OK-------| [42].                                        |
      |             ------------------------------------------------
      |
-----------------------------------------------------
| Trip circuit breakers [5] and [6].                |
| Replace interphone amplifier [7].                 |
-----------------------------------------------------
                         |
                       NOT OK
                         |
                         |
                    ------------------------------------------------
                    | Trip circuit breakers [5] and [6].           |
                    | In RH electronics rack, on shelf 5-216,      |
                    | replace relay [43].                          |
                    ------------------------------------------------
```

Chart 118

```
*************************************-------------------------------
* NO VOICE COMMUNICATION.           *| GROUND EQUIPMENT REQUIRED   |
*************************************-------------------------------
                                     | DESCRIPTION        PART NO. |
                                     -------------------------------
                                     | MULTIMETER                  |
                                     -------------------------------

*****************************************************
* Check 28VDC at output of circuit breaker [6].     *
*****************************************************
    |      |
    |      |               -----------------------------------------------
    |      |              | Trip circuit breaker [6]                      |
 NOT OK   OK-------------| In RH electronics rack, on shelf 5-216,       |
    |                     | replace relay [45].                           |
    |                      -----------------------------------------------
    |
*****************************************************
* Replace circuit breaker [6].                      *
*****************************************************
```

Chart 119

```
*************************************-------------------------------
* NO VOICE COMMUNICATION.           *| GROUND EQUIPMENT REQUIRED    |
*************************************-------------------------------
                                     | DESCRIPTION         PART NO. |
                                     -------------------------------
                                     | MULTIMETER                   |
                                     -------------------------------

****************************************************
* Check 28VDC at output of circuit breaker [5].    *
****************************************************
     |      |
     |      |      -----------------------------------------------
     |      |      | Trip circuit breaker [5]                    |
 NOT OK    OK------| In RH electronics rack, on shelf 5-216,     |
     |             | replace relay [14].                         |
     |             -----------------------------------------------
     |
****************************************************
* Replace circuit breaker [5].                     *
****************************************************
```

Chart 120

```
**************************************-------------------------------
* NO VOICE COMMUNICATION.            *| GROUND EQUIPMENT REQUIRED  |
**************************************-------------------------------
                                      | DESCRIPTION        PART NO. |
                                      -------------------------------
                                      | MULTIMETER                  |
                                      -------------------------------

*****************************************************
* Check 28VDC at output of circuit breaker [46].    *
*****************************************************
     |      |
     |      |       ----------------------------------------------
     |      |       | Trip circuit breaker [46]                  |
 NOT OK    OK-------| In RH electronics rack, on shelf 5-216,    |
     |              | replace relay [14].                        |
     |              ----------------------------------------------
     |                        |
     |                        |
     |                        |              --------------------------------
     |                  NOT OK---| Trip circuit breaker [46].   |
     |                           | In RH electronics rack, on   |
     |                           | shelf 5-216, replace relay [45]|
     |                           --------------------------------
*****************************************************
* Check 28VDC at output of circuit breaker [46].    *
*****************************************************
     |      |
     |      |       ----------------------------------------------
 NOT OK    OK-------| Replace circuit breaker [46].              |
     |              ----------------------------------------------
     |
-----------------------------------------------------
| Ref 24-41-00, Trouble Shooting.                   |
-----------------------------------------------------
```

Chart 121

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[1] Captain's audio selector panel		7-211	R 53	Flight compart-ment	23-41-21 R/I	23-51-01
[2] First Off. audio selector panel		7-211	R 54	Flight compart-ment	23-41-21 R/I	23-51-01
[3] Flight En-gineer's audio selector panel		8-214	R 56	Flight compart-ment	23-41-21 R/I	23-51-01
[4] First Su-per numerary's audio selector panel		7-213	R 55	Flight compart-ment	23-41-21 R/I	23-51-01
[5] Circuit breaker, 28VDC		1-213	R 89	Map Ref. K19	24-50-00 R/I	23-51-01
[6] Circuit breaker, 28VDC		3-213	R 90	Map Ref. H2	24-50-00 R/I	23-51-01
[7] Interphone amplifier	216ES	5-216	R 62	RH fwd electronic rack	23-41-33 R/I	23-51-01
[8] Captain's jack panel		1-211	R 57	Flight compart-ment	23-41-41 R/I	23-51-01
[9] First off. jack panel		1-212	R 58	Flight compart-ment	23-41-41 R/I	23-51-01
[10] Flight Engineer's jack panel		8-214	R 60	Flight compart-ment	23-41-41 R/I	23-51-01
[11] First Supernumera-ry's jack panel		7-213	R 59	Flight compart-ment	23-41-41 R/I	23-51-01

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[12] PTT switch on Captain's handwheel		8-211	R 65	Flight compartment		23-51-01
[13] PTT switch on First Off. handwheel		4-212	R 66	Flight compartment		23-51-01
[14] Relay		5-216	R103	RH fwd electronic rack		23-51-01
[15] Switch		3-213	R 67	Flight compartment		23-51-01
[16] Switch		1-211	R 91	Flight compartment		23-51-01
[17] Switch		1-212	R 92	Flight compartment		23-51-01
[18] Circuit breaker, 28VDC		1-213	W371	Map Ref. M21	24-50-00 R/I	23-51-01
[19] Circuit breaker, 28VDC		5-213	W372	Map Ref. C17	24-50-00 R/I	23-51-01
[20] Audio warning unit		7-216	W381	RH fwd electronic rack	31-23-11 R/I	23-51-01 31-23-01
[21] Interphone box	715	715	R 75	Nose gear leg	23-41-43 R/I	23-41-01 23-51-01
[22] Second Supernumerary's jack panel		12-215	R 93	LH fwd electronic rack	23-41-41 R/I	23-51-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[23] Switch		20-215	R 52	LH fwd electronic rack		23-51-01
[24] Switch		20-215	R 94	LH fwd electronic rack		23-51-01
[25] Switch		4-211	R 61	Flight compart- ment		23-51-01
[26] Ground service jack	Door 113BB	114	R 73	Nose cone	23-41-44 R/I	23-41-01
[27] Ground service jack	Door 128AB	128	R 74	Ground connector	23-41-44 R/I	23-41-01
[28] Ground service jack	Door 123AB	124	R 76	Radar com- partment	23-41-44 R/I	23-41-01
[29] Ground service jack		733	R 77	LH main gear	23-41-42 R/I	23-41-01
[30] Ground service jack		743	R 78	RH main gear	23-41-42 R/I	23-41-01
[31] Ground service jack	Door 421HB	421	R 79	LH inboard engine	23-41-44 R/I	23-41-01
[32] Ground service jack	Door 431HB	431	R 80	RH inboard engine	23-41-44 R/I	23-41-01
[33] Ground service jack	Door 313BB	314	R 81	Tail cone	23-41-44 R/I	23-41-01
[34] Ground service jack	Door 843	7-244	R 82	RH aft electronic rack	23-41-44 R/I	23-41-01
[35] Ground service jack	Door 131AZ	132	R 83	Cargo com- partment	23-41-44 R/I	23-41-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[36] Ground service jack	Door 131AZ	132	R 84	Cargo compartment	23-41-44 R/I	23-41-01
[37] Ground service jack	Door 151CB	152	R 85	Air compartment	23-41-44 R/I	23-41-01
[38] Ground service jack	Door 151DB	151	R 86	Hydraulic bay, FR70B	23-41-44 R/I	23-41-01
[39] Ground service jack	Door 153BB	154	R 87	Hydraulic bay, FR72	23-41-44 R/I	23-41-01
[40] Ground service jack	Door 844	244	R 88	On bulkhead door	23-41-44 R/I	23-41-01
[41] Ground service jack	Door 123BB	12-123	R 95	Electronic rack	23-41-44 R/I	23-41-01
[42] Ground service jack	Door 194JB	194	R 96	Refuelling fillet (RH karman)	23-41-44 R/I	23-41-01
[43] Relay		5-216	R 69	RH fwd electronic rack		23-41-01
[44] Switch		29-214	R 70	Flight compartment		23-41-01
[45] Relay		5-216	R104	RH fwd electronic rack		23-51-01
[46] Circuit breaker, 28VDC		25-216	R102	Map Ref D2	24-50-00 R/I	23-51-01

Component Identification
Table 101

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INTERPHONE - MAINTENANCE PRACTICES

1. General

   A. Nose Intercom Jack Box

   The flap for the intercom jack box must be closed by hand after use as problems have arisen with fluid ingress. A modification is in hand whereby the flap becomes self closing, this will however result in using both hands to insert the jack.

   B. Audio Selector Panels

   Post modification CM 42522 aircraft have ASP's G3836/BA fitted to Captain's, First Officer's and Engineering Officer's positions. The First Supernumerary position may be fitted with pre or post mod control panels. Post mod ASP's are identified by a red spot on top right plastek panel securing screw.

INTERPHONE - ADJUSTMENT/TEST

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Boomsets	Aircraft Equipment
1 Ground Service Telephone Equipment	

B. Prepare

(1) The aircraft is on the ground, with landing gear down-locked and shock absorbers compressed.

(2) Make certain that RAD-INT PTT switch is in intermediate position :

(a) On Captain's and First Officer's control column handwheels.

(b) On First Supernumerary's panel 3-213

(3) On Flight Engineer's panel 29-214 (zone 214), make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(4) On panel 4-211, make certain that I/PHONE NORMAL-CABIN switch is in NORMAL position.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(a) All transmission keys are disengaged.

(b) All reception push-buttons are disengaged.

(c) INT-R/T PTT switch is in intermediate position. tion.

(d) BOOM-MASK switch is in BOOM position.

(e) VOICE filter push-button is disengaged.

(6) On Second Supernumerary's panel 20-215, make certain that :

(a) BOOM-MASK switch is in BOOM position.

(b) ON-OFF PTT switch is in OFF position.

(7) On Captain's and First Officer's consoles (1-211 and 1-212), make certain that LOUDSPEAKER ON-OFF switches are in OFF position.

(8) At Stewards' stations (Zones 221, 223, 241), make certain that telephone handsets are connected.

(9) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(10) Operate electronics rack ventilation (Ref. 21-21-00).

(11) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
No.2 INPH SUP	3-213	R 90	H 2
LH CONSOLE INST LTS SUP	14-215	L 374	B11
3CM LH INST LTS SUP	13-216	L 377	E 8
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
RH CONSOLE INST LTS SUP		L 373	E 8

(12) On panel 25-216, trip circuit breaker R102 (map ref. D2).

C. Tests

(1) Test of lighting circuits

(a) Place the following controls in ON position :
- LH CONSOLE on Captain's console 1-211,
- RH CONSOLE on First Officer's console 1-212,
- LIGHT CONTROL on panel 3-213.

(b) Turn clockwise the following lighting control knobs :
- LIGHTING CENTRE CONSOLE PANEL on panel 4-211
- LIGHTING PANEL on Flight Engineer's panel 11-214.

(c) On each jack panel, make certain that integral lighting is in correct operating condition.

(d) On each audio selector panel, make certain that :
- Integral lighting is in correct operating condition,
- The transmission keys and the reception push-buttons will illuminate as soon as they are operated.

(2) Voice communications between the various Crew Members' stations.

(a) Communication between Captain's and First Officer's stations using boomsets.

(a1) On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels :
- Make certain that a boomset is connected to relevant HEADSET and MIC jacks.

(a2) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :
- Press INT reception push-button and place integral potentiometer in intermediate position.

(a3) On Captain's control column handwheel, place RAD-INT PTT switch in INT position, speak into Captain's boomset microphone and make certain that :
- Voice is received at First Officer's boomset.
- On First Officer's audio selector panel, action on potentiometer integral with INT push-button does not cause any interruption or crackling. Return potentiometer to intermediate position.

(a4) On Captain's control column handwheel, place RAD-INT PTT switch in intermediate position.

(a5) On First Officer's control column handwheel, place RAD-INT PTT switch in INT position ; speak into First Officer's boomset microphone and make certain that :
- Voice is received at Captain's boomset
- On Captain's audio selector panel, action on potentiometer integral with INT reception push-button does not cause any interruption crackling. Return potentiometer to intermediate position.

(a6) On First Officer's control column handwheel, place RAD-INT PTT switch in intermediate diate position.

(b) Voice communications between Flight Engineer's station and interphone box using boomset.

(b1) On nose gear leg, connect a ground telephone equipment to one of the jacks on interphone box.

NOTE : The upper and lower jacks on interphone box are connected in parallel.

(b2) On Flight Engineer's audio selector panel, place INT-R/T PTT switch in INT position, then speak into Flight Engineer's boomset microphone and make certain that :
- voice is received at ground telephone headset. Then return PTT switch to intermediate position.

(b3) Speak into ground telephone microphone and make certain that :
- Voice is received at Flight Engineer's boomset
- On Flight Engineer's audio selector panel, action on potentiometer integral with INT reception push-button does not cause any interruption or crackling. Return potentiometer to intermediate position.

(c) Voice communication between First and Second Supernumerary's stations using boomsets.

(c1) On First Supernumerary's panel 3-213, place PTT switch in INT position.

(c2) Speak into First Supernumerary's boomset and make certain that :

- Voice is received at Second Supernumerary's boomset then return PTT switch to intermediate position.

(c3) On Second Supernumerary's panel 20-215, place ON-OFF PTT switch in ON position, then speak into Second Supernumerary's boomset microphone and make certain that :
- Voice is received at First Supernumerary's boomset. Then return PTT switch to OFF position.

(d) Voice communications between Captain's station and Steward's station 1.

(d1) On panel 4-211, place I/PHONE CABIN-NORMAL switch in CABIN position.

(d2) On Captain's audio selector panel, make certain that INT reception push-button is engaged.

(d3) On Captain's control column handwheel, place RAD-INT PTT switch in INT position, then speak into Captain's boomset microphone and make certain that :
- Voice is received at telephone handset at Steward's station 1.

(d4) On Captain's control column handwheel, place RAD-INT PTT switch in intermediate position.

(d5) Speak into telephone handset at Steward's station 1, while pressing its PTT switch. Make certain that :
- Voice is received at Captain's boomset.

(d6) Hook up telephone handset at Steward's station 1.

(e) Voice communications between Steward's station 2 and interphone box.

(e1) Make certain that the ground telephone equipment is connected to one of the jacks on interphone box.

(e2) Take hold of telephone handset at Steward's station 2. Speak into telephone handset microphone while pressing PTT switch and make certain that :

- Voice is received at ground telephone headset.

(e3) Speak into ground telephone microphone and make certain that voice is received at telephone handset at Steward's station 2.

(e4) Hook up telephone handset at Steward's station 2.

(e5) On panel 4-211, place I/PHONE CABIN-NORMAL switch in NORMAL position.

(f) Voice communications between Steward's station 3 and one ground service jack (Ref. Fig. 501)

(f1) On Flight Engineer's panel 29-214, place SERVICE I/PHONE FLIGHT-GROUND switch in GROUND position.

(f2) Connect a ground telephone equipment to a ground service jack other than those on interphone box.
- Ground Service Jack Location Table

REF	DESCRIPTION	PANEL	ACCESS	
			ZONE	DOOR
R 73	In Nose Cone		114	113BB
R 74	Near Ground Connector		128	128AB
R 75	Interphone Box on Nose Gear Leg		715	
R 76	In Radar Bay		124	123AB
R 77	On LH Gear Leg		733	
R 78	On RH Gear Leg		743	
R 79	Near Engine 2 Air Intake		421	421LB
R 80	Near Engine 3 Air Intake		431	431LB
R 81	In Tail Cone		314	313BB
R 82	On Aft Electronics Rack		244	843
R 83	In Baggage Compartment		132	131AZ
R 84	In Baggage Compartment		131	131AZ
R 85	In Air Bay (FR67)		152	151CB
R 86	In Hydraulic Bay (FR70A)		152	151DB
R 87	In Hydraulic Bay (FR72 to 81)		154	153BB
R 88	Near Passenger Compartment Aft Access Door		244	844
R 95	In INS Bay, on INS Rack (FR16-18)		123	123BB
R 96	On RH Refuelling Coupling		194	194JB

REF	DESCRIPTION	PANEL	ACCESS ZONE	ACCESS DOOR

Unit

(f3) Take hold of telephone handset at Steward's station 3, speak into handset microphone while pressing PTT switch and make certain that voice is received at ground telephone headset.

(f4) Speak into ground telephone microphone and make certain that voice is received at telephone handset at Steward's station 3.

(f5) On Flight Engineer's console, place SERVICE I/PHONE FLIGHT-GROUND switch in FLIGHT position.

(f6) At Steward's station 3, hook up telephone handset.

D. Close-Up

(1) Disconnect ground telephone equipment from ground service jack used.

(2) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :
- disengage INT reception push-button
- make certain that INT-R/T PTT switches are in intermediate position
- make certain that BOOM-MASK switch is in BOOM position

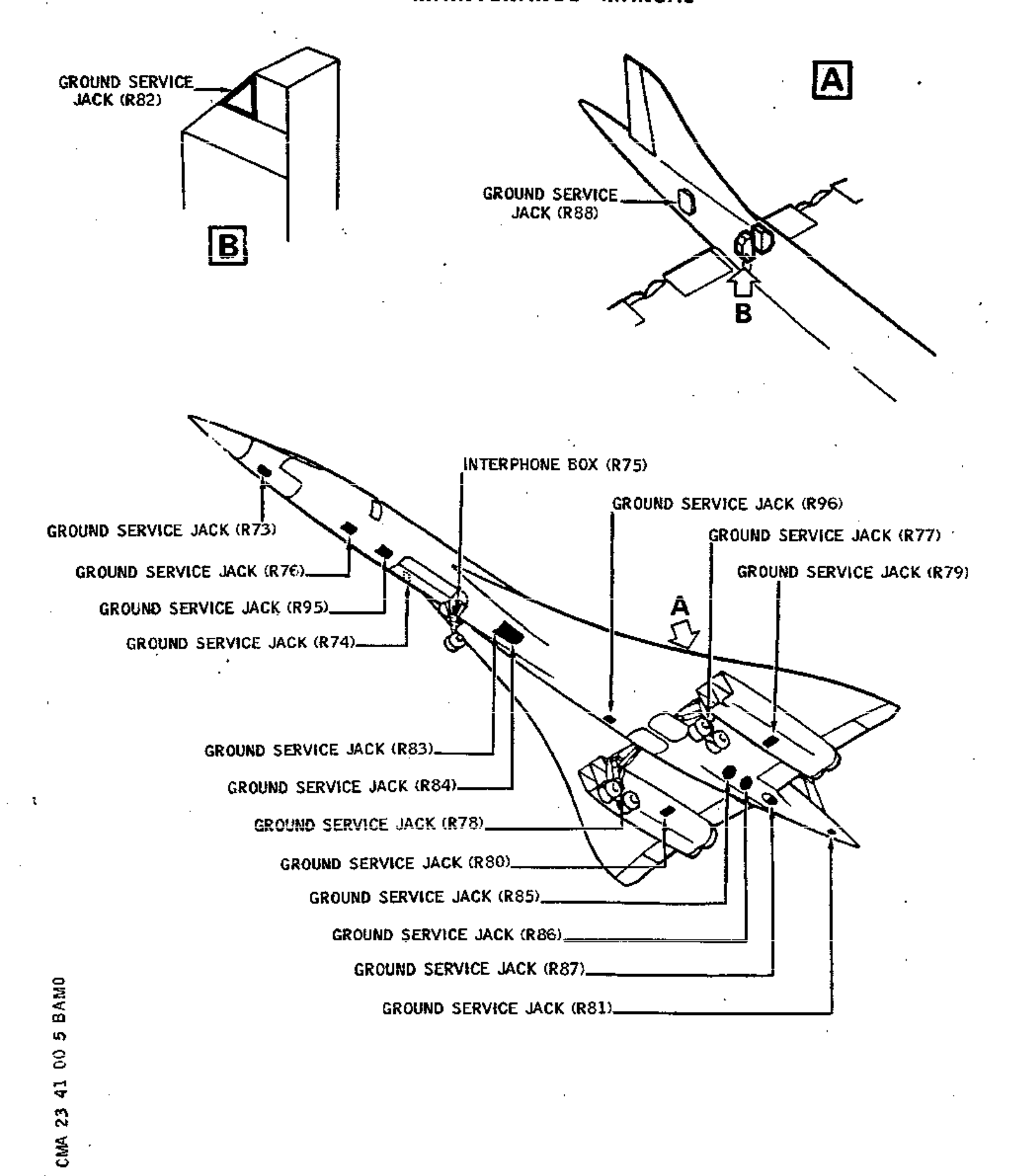
(3) On Captain's console 1-211 and on First Officer's console 1-212, place LH CONSOLE and RH CONSOLE controls in OFF position.

(4) On Flight Engineer's panel 11-214, place LIGHTING PANEL control in OFF position.

(5) On panel 4-211, turn LIGHTING CENTRE CONSOLE PANEL knob fully counterclockwise.

(6) Stop electronics rack ventilation (Ref. 21-21-00).

(7) De-energize the aircraft electrical network and dis-



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Location of Ground Service Jacks
Figure 501

connect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
5 Boomsets	
5 Hand Microphones	
2 Ground Telephone Equipment	

B. Prepare

(1) The aircraft is on the ground, with landing gear down-locked and shock absorbers compressed.

(2) Make certain that RAD-INT PTT switch is in intermediate position :

(a) On Captain's and First Officer's control column handwheels.

(b) On First Supernumerary's panel 3-213.

(3) On Flight Engineer's panel 29-214 (zone 214), make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(4) On panel 4-211, make certain that I/PHONE NORMAL-CABIN switch is in NORMAL position.

(5) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(a) All transmission keys are disengaged.

(b) All reception push-buttons are disengaged.

(c) INT-R/T PTT switch is in intermediate position.

(d) BOOM-MASK switch is in BOOM position.

(e) VOICE filter push-button is disengaged.

(6) On Second Supernumerary's panel 20-215, make certain

that :
- BOOM-MASK switch is in BOOM position
- ON-OFF PTT switch is in OFF position

(7) On Captain's and First Officer's consoles (1-211 and 1-212), make certain that LOUDSPEAKER ON-OFF switches are in OFF position.

(8) At Stewards' stations (Zones 221, 223, 241), make certain that telephone handsets are connected.

(9) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(10) Operate electronics rack ventilation (Ref. 21-21-00).

(11) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
AUDIO WARN SYS SUP1		W 371	M21
No.2 INPH SUP	3-213	R 90	H 2
AUDIO WARN SYS SUP2	5-213	W 372	C17
LH CONSOLE INST LTS SUP	14-215	L 374	B11
3CM LH INST LTS SUP	13-216	L 377	E 8
CTR CONSOLE INST LTS SUP	14-216	L 405	B 8
RH CONSOLE INST LTS SUP		L 373	E 8

(12) On panel 25-216, trip circuit breaker R 102 (map ref. D2).

C. Tests

(1) Test of lighting circuits.

(a) Place the following switches in ON position :
- LH CONSOLE on Captain's console 1-211,
- RH CONSOLE on First Officer's console 1-212,
- LIGHT CONTROL on panel 3-213.

(b) Turn clockwise the following lighting control

knobs :
- LIGHTING CENTRE CONSOLE PANEL on panel 4-211,
- LIGHTING PANEL on Flight Engineer's console panel 11-214.

(c) On each jack panel, make certain that integral lighting operates correctly.

(d) On each audio selector panel, make certain that :
- Integral lighting operates correctly
- The transmission keys and the reception push-buttons will illuminate as soon as they are operated.

(2) Voice communications between the various Crew Members' stations using boomsets.

(a) Connection of boomsets.

(a1) On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels :
- Connect a boomset to relevant HEADSET and MIC jacks.

(a2) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :
- Press INT reception push-button and place integral potentiometer in intermediate position.

(b) Communication between Captain's and First Officer's stations

(b1) On Captain's control column handwheel, place RAD-INT PTT switch in INT position, speak into Captain's boomset microphone and make certain that :
- Voice is received at First Officer's boomset.
- On Front Officer's audio selector panel, action on potentiometer integral with INT reception push-button does not cause any interruption or crackling. Then return potentiometer to intermediate position.

(b2) On Captain's control column handwheel, place RAD-INT PTT switch in intermediate position.

(b3) On First Officer's control column handwheel, place RAD-INT PTT switch in INT position, speak into First Officer's boomset microphone and make certain that :
- Voice is received at Captain's boomset.
- On Captain's audio selector panel, action on potentiometer integral with INT reception push-button does not cause any interruption or crackling. Then, return potentiometer to intermediate position.

(b4) On First Officer's control column handwheel, place RAD-INT PTT switch in intermediate position.

(c) Voice communications between Flight Engineer's station and interphone box.

(c1) On nose gear leg connect a ground telephone equipment to one of the jacks on interphone box.

(c2) On Flight Engineer's audio selector panel, place INT-R/T PTT switch in INT position. Speak into Flight Engineer's boomset microphone and make certain that :
- Voice is received at ground telephone headset. Then return PTT switch to intermediate position.

(c3) Speak into ground telephone microphone and make certain that :
- Voice is received at Flight Engineer's boomset
- On Flight Engineer's audio selector panel, action on potentiometer integral with INT reception push-button does not cause any interruption or crackling. Return potentiometer to intermediate position.

(d) Voice communications between First and Second Supernumerary's stations.

(d1) On First Supernumerary's panel 3-213, place RAD-INT PTT switch in INT position and speak into First Supernumerary's boomset microphone and make certain that :
- Voice is received at Second Supernumerary's boomset.

(d2) On First Supernumerary's panel, place RAD-

INT PTT switch in intermediate position.

(d3) On Second Supernumerary's panel 20-215, place ON-OFF PTT switch in ON position. Speak into Second Supernumerary's boomset microphone and make certain that :
- Voice is received at First Supernumerary's boomset
- On First Supernumerary's audio selector panel, action on potentiometer integral with INT reception push-button does not cause any interruption or crackling. Return potentiometer to intermediate position.

(3) Voice communications using hand microphones

Impossible with that audio selector panel. The test will be carried out in radio function (Ref. 23-11-00 or 23-21-00, Adjustment/Test).

(4) Reception at audio warning loudspeakers

(a) On Captain's console, on panel 1-211, place LOUD-SPEAKER ON-OFF switch in ON position.

(b) On First Officer's console, on panel 1-212, place LOUDSPEAKER ON-OFF switch in ON position.

(c) On Captain's audio selector panel, place INT-R/T PTT switch in INT position, speak into Captain's boomset microphone and make certain that :
- First Officer's loudspeaker output level is
R reduced
- Captain's loudspeaker output level is reduced
- No acoustic feedback noticeable.

(d) On Captain's audio selector panel, place INT-R/T PTT switch in intermediate position.

(e) On First Officer's audio selector panel, place INT-R/T PTT switch in INT position, speak into First Officer's boomset microphone and make certain that :
R - Captain's loudspeaker output level is reduced,
- First Officer's loudspeaker output level is reduced,
- No acoustic feedback noticeable.

(f) On First Officer's audio selector panel, place INT-R/T PTT switch in intermediate position.

(g) On Flight Engineer's audio selector panel, place INT-R/T PTT switch in INT position, speak into Flight Engineer's boomset microphone and make certain that :
R - Captain's loudspeaker output level is reduced,
- First Officer's loudspeaker output level is
R reduced,
- No acoustic feedback noticeable.

(h) On Flight Engineer's audio selector panel, place INT-R/T PTT switch in intermediate position.

R (i) On First Supernumemary's audio selector panel,
R place INT-R/T PTT switch in INT position, speak
R into First Supersumemary's boomset microphone and
R make certain that :
R - Captain's loudspeaker output level is reduced
R - First Officer's loudspeaker output level is
R reduced
R - No acoustic Feedback noticeable.

R (j)On First Supernumemary's audio selector panel, place
R INT-R/T PTT switch in intermediate position.

R (k) On Captain's and First Officer's consoles (1-211 and 1-212), place LOUDSPEAKER ON-OFF switches in OFF position.

R After SB 23-026 For A/C 001-007,

R (4)Reception at audio warning loudspeakers

R (a) On Captain's console, on panel 1-211, place LOUD-
R SPEAKER ON-OFF switch in ON position.

R (b) On First Officer's console, on panel 1-212, place
R LOUDSPEAKER ON-OFF switch in ON position.

R (c) On Captin's audio selector panel, place INT-R/T
R PTT switch in INT position, speak into Captain's
R boomset microphone and make certain that :
R - First Oficer's loudspeaker output level is
R reduced.
R - Captain's loudspeaker output level is reduced
R - No acoustic feedback noticeable.

R (d) On Captain's audio selector panel, place INT-R/T
R PTT switch in intermediate position.

R (e) On First Officer's audio selector panel, place

INT-R/T PTT switch in INT position, speak into First Officer's boomset microphone and make certain that :
- Captain's loudspeaker output level is reduced,
- First Officer's loudspeaker output level is reduced,
- No acoustic feedback noticeable.

(f) On First Officer's audio selector panel, place INT R/T PTT switch in intermediate position.

(g) On Flight Engineer's audio selector panel, place INT-R/T PTT switch in INT Position, speak into Flight Engineer's boomset microphone and make certain that :
- Captain's loudspeaker output level is reduced
- First Officer's loudspeaker output level is reduced
- No acoustic feedback noticeable.

(h) On Flight Engineer's audio selector panel, place INT-R/T PTT switch in intermediate position.

(i) On First Supernumerary's audio selector panel, place INT-R/T PTT switch in INT position speak into first supernumerary's boomset microphone and make certain that :
- Captain's loudspeaker output level is reduced
- First officer's loudspeaker output level is reduced
- No accoustic feedback noticeable.

(j) On First Supernumerary's audio selector panel, place INT-R/T PTT switch in intermediate position.

(k) On First Officer's console 1-212, place LOUD-SPEAKER ON-OFF switch in OFF position.

(l) On panel 1-213, trip AUDIO WARN SYS SUP1 circuit breaker W371 (Map Ref M21).

(m) On Captain's audio selector panel, make certain that :
- INT reception push-button is engaged
- INT-R/T PTT switch is in intermediate position.

(n) On nose gear leg, speak into ground telephone microphone and make certain that :
- Captain's loudspeaker output level is reduced.

(o) On nose gear leg, stop modulation of ground tele-

R phone microphone.

R (p) On panel 1-213, reset AUDIO WARN SYS SUP 1 circuit
R breaker W371 (Map Ref M21).

R (q) On nose gear leg, speak into ground telephone
R microphone and make certain that :
R - Captain's loudspeaker output level is normal.

R (r) On nose gear leg, stop modulation of ground
R telephone microphone.

R (s) On Captain's console 1-211, place LOUDSPEAKER
R ON-OFF switch in OFF position.

(5) Voice communications between Crew Members' stations and Stewards' stations.

(a) Communications between Captain's station and Steward's station 1.

(a1) On panel 4-211, place I/PHONE CABIN-NORMAL switch in CABIN position.

(a2) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that INT reception push-button is engaged.

(a3) On Captain's control column handwheel, place RAD-INT PTT switch in INT position, speak into Captain's boomset microphone and make certain that :
- Voice is received at telephone handset at Steward's station 1.

(a4) On Captain's control column handwheel, place RAD-INT PTT switch in intermediate position.

(a5) At Steward's station 1, speak into telephone handset microphone while pressing PTT switch and make certain that :
- Voice is received at Captain's boomset

(a6) Hook up telephone handset at Steward's station 1.

(b) Voice communications between First Officer's station and Steward's station 2.

(b1) On First Officer's control column handwheel,

place RAD-INT PTT switch in INT position, speak into First Officer's boomset microphone and make certain that :
- Voice is received at telephone handset at Steward's station 2.

(b2) On First Officer's control column handwheel place RAD-INT PTT switch in intermediate position.

(b3) At Steward's station 2, speak into telephone handset microphone while pressing PTT switch and make certain that :
- Voice is received at First Officer's boomset.

(b4) Hook up telephone handset at Steward's station 2.

(c) Voice communications between interphone box and Steward's station 3.

(c1) On nose gear leg speak into ground telephone microphone and make certain that :
- Voice is received at telephone handset at Steward's station 3.

(c2) At Steward's station 3, speak into telephone handset microphone while pressing PTT switch and make certain that :
- Voice is received at ground telephone headset.

(c3) Hook up telephone handset at Steward's station 3.

(d) Voice communications between First Supernumerary's station and ground service network.

(d1) Repeat operations described in Operational test, Paragraphs 1.C (2) (f) (f1) and 1.C (2) (f) (f2).

(d2) On panel 4-211, make certain that I/PHONE CABIN-NORMAL switch is in CABIN position.

(d3) On First Supernumerary's audio selector panel, place INT-R/T PTT switch in INT position, speak into First Supernumerary's boomset microphone and make certain that :
- Voice is received at ground telephone head-

set

(d4) On First Supernumerary's audio selector panel, place INT-R/T PTT switch in intermediate position.

(d5) Speak into ground telephone microphone and make certain that :
- Voice is received at First Supernumerary's boomset.

(d6) On panel 4-211, place I/PHONE CABIN-NORMAL switch in NORMAL position.

(d7) On Flight Engineer's panel 29-214, place SERVICE I/PHONE FLIGHT-GROUND switch in FLIGHT position.

(6) Power Supply Check

(a) On panel 25-216, make certain that circuit breaker R102 (Map Ref. D2) is tripped, safetied and tagged

(b) Speak in turn in each Crew Member's boomset microphone, placing the associated PTT switch in INT position.
- Voice is received at other Crew Member's boomsets
On completion of test, place PTT switch in intermediate position

(c) On panel 1-213, trip, safety and tag circuit breaker R89 (Map Ref. K19)

(d) Repeat operation 2.C (6) (b). Results identical

(e) On panel 3-213, trip, safety and tag circuit breaker R90 (Map Ref. H2).

(f) Repeat operation 2.C (6) (b). Voice communications are no longer possible between the Crew Members.

<u>CAUTION</u> : THE FOLLOWING OPERATIONS ARE TO BE CARRIED OUT WITH AC AND DC BUSBARS DISCONNECTED AND GROUND SERVICE BUSBAR CONNECTED THROUGH CIRCUIT BREAKER R102. MAKE CERTAIN THAT THESE OPERATIONS DO NOT INTEFERE WITH OTHER TESTS IN PROGRESS ON AIRCRAFT.

(g) Ground busbar supply

(g1) On Flight Engineer's panel 3-214, place GRD PW CONTROL CLOSE-TRIP switch in TRIP position :
- GRND PWR AVAILABLE indicator light is illuminated.

(g2) On panel 25-216, reset INPH SUP circuit breaker R102 (Map Ref. D2).

(g3) Repeat operation 2.C (6) (b). Results identical.

(g4) On Flight Engineer's panel 3-214, place GRD PW CONTROL CLOSE-TRIP switch in CLOSE position :

(h) Reset the following circuit breakers :
- Circuit breaker R89 on panel 1-213 (Map Ref. K19)
- Circuit breaker R90 on panel 3-213 (Map Ref. H2).

D. Close-Up

(1) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :

(a) Disengage all reception push-buttons.

(b) Make certain that INT-R/T PTT switch is in intermediate position.

(2) At Second Supernumerary's station (Zone 215), on panel 20-215 :

(a) Make certain that ON-OFF PTT switch is in OFF position.

(b) On jack panel, disconnect boomset from jacks and put it back into test set.

(3) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's jack panels :

(a) Disconnect boomset from jacks and put it back into test set.

(4) On Captain's console 1-211 :

(a) Make certain that LOUDSPEAKER ON-OFF switch is in OFF position.

(b) Place LH CONSOLE switch in OFF position.

(5) On First Officer's console 1-212 :

(a) Place LOUDSPEAKER ON-OFF switch in OFF position.

(b) Place RH CONSOLE switch in OFF position.

(6) On panel 4-211 :

(a) Make certain that I/PHONE CABIN-NORMAL switch is in NORMAL position.

(b) Turn LIGHTING CENTRE CONSOLE PANEL knob fully counterclockwise.

(7) On First Supernumerary's panel 3-213 :

(a) Place LIGHT CONTROL switch in OFF position.

(b) Make certain that RAD-INT PTT switch is in intermediate position.

(8) On Captain's and First Officer's control column handwheels, make certain that RAD-INT PTT switch is in intermediate position.

(9) On Flight Engineer's console :

(a) On panel 29-214, make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(b) On panel 11-214, turn LIGHTING CONTROL knob fully counterclockwise.

(10) Remove ground telephone equipment from ground service jacks and put them back into test set.

(11) Stop electronics rack ventilation (Ref. 21-21-00).

(12) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

3. System Test

A. Equipment and Materials

Refer to Functional Test, Paragraph 2.A

B. Prepare

Refer to functional Test, Paragraph 2.B

C. Test

(1) Test of lighting circuits

Refer to Functional Test, Paragraph 2.C (1)

(2) Voice communications using boomsets

Repeat operations described in Functional Test, Paragraph 2.C (2)

(3) Voice communications using hand microphones

Refer to Functional Test, Paragraph 2.C (3)

(4) Voice communications using oxygen mask microphone and headset.

(a) On telephone connector at location of Captain's, First Officer's Flight Engineer's, First and Second Supernumerary's oxygen boxes, connect a junction cable (from test set).

(b) Voice communications between Captain's and First Officer's stations.

(b1) Connect a hand microphone to junction cables

(b2) On Captain's and First Officer's audio selector panels :
- Place BOOM-MASK switch in MASK position
- Make certain that INT reception push-button is engaged and its integral potentiometer placed in intermediate position
- Place INT-R/T PTT switch in INT position.

(b3) Speak into Captain's hand microphone while pressing its integral PTT switch.
Make certain that voice is received at First Officer's headset.

(b4) On Captain's audio selector panel, place :
- INT-R/T PTT switch in intermediate position
- BOOM-MASK switch in BOOM position

(b5) Speak into First Officer's hand microphone while pressing its integral PTT switch. Make certain that voice is received at Captain's headset.

(b6) On First Officer's audio selector panel, place :
- INT-R/T PTT switch in intermediate position
- BOOM-MASK switch in BOOM position.

(c) Voice communications between First Engineer's and First Supernumerary's stations.

(c1) Connect a hand microphone to junction cable.

(c2) On Flight Engineer's and First Supernumerary's audio selector panels, place :
- BOOM-MASK switch in MASK position
- INT-R/T PTT switch in INT position
- Make certain that INT reception push-button is engaged and its integral potentiometer in intermediate position.

(c3) Speak into Flight Engineer's hand microphone while pressing its integral PTT switch. Make certain that voice is received at First Supernumerary's headset.

(c4) On Flight Engineer's audio selector panel, place :
- INT-R/T PTT switch in intermediate position
- BOOM-MASK switch in BOOM position

(c5) Speak into First Supernumerary's hand microphone while pressing its integral PTT switch. Make certain that voice is received at Flight Engineer's headset.

(d) Voice communications between First and Second Supernumerary's stations.

(d1) On Second Supernumerary's panel 20-215 :
- Place BOOM-MASK switch in MASK position
- Place ON-OFF PTT switch in ON position

(d2) Speak into First Supernumerary's hand micro-

phone while pressing its integral PTT switch. Make certain that voice is received at Second Supernumerary's headset.

(d3) Speak into Second Supernumerary's hand microphone while pressing its integral PTT switch. Make certain that voice is received at First Supernumerary's headset.

(d4) On Second Supernumerary's panel 20-215 :
- Place BOOM-MASK switch in BOOM position
- Place ON-OFF PTT switch in OFF position.

(d5) On First Supernumerary's audio selector :
- Place INT-R/T PTT switch in intermediate position
- Place BOOM-MASK switch in BOOM position.

(5) Reception at audio warning loudspeakers

(a) Repeat operations described in Functional Test, Paragraph 2.C (4).

(6) Voice communications between Crew Members' stations and Stewards' stations.

(a) Repeat operations described in Functional Test, Paragraph 2.C (5) (a) to 2.C (5) (c) inclusive.

(7) Test of ground service network

(a) Repeat operations described in Functional Test, Paragraph 2.C (5) (d) (d1) to 2.C (5) (d) (d5) inclusive.

(b) Using two ground telephone equipment, establish successively voice communications (transmission - reception) between all ground service jacks, proceeding by pairs (Ref. ground service jack location table).

(c) On panel 4-211, place I/PHONE CABIN-NORMAL switch in NORMAL position.

(d) On Flight Engineer's panel 29-214, place SERVICE I/PHONE FLIGHT-GROUND switch in FLIGHT position.

(8) Power supply check

(a) Repeat operations described in Functional test, Paragraph 2.C (6).

(9) Test of Crew Members' network with flight interphone at full load.

(a) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :
- All transmission keys are disengaged
- INT reception push-button is engaged
- INT-R/T PTT switch is in INT position
- BOOM-MASK switch is in BOOM position

(b) At Second Supernumerary's station
- place ON-OFF PTT switch in ON position
- make certain that BOOM-MASK switch is in BOOM position

(c) On nose gear leg, connect a ground telephone equipment to one of the jacks on interphone box.

(d) At Flight Engineer's, station, make certain that SERVICE I/PHONE FLIGHT-GROUND is in FLIGHT position.

(e) Speak simultaneously at several stations and check quality of the voice communications.

(10) Test of Crew Members' network with ground interphone at full load.

(a) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, place PTT switch in intermediate position.

(b) On panel 4-211, place I/PHONE CABIN-NORMAL switch in CABIN position.

(c) On Flight Engineer's console, place SERVICE I/PHONE FLIGHT - GROUND switch in GROUND position

(d) Disconnect ground telephone equipment from interphone box and connect it to another ground service jack.

(e) Speak simultaneously
- From Captain's , First Officer's, Flight Engineer's or First Supernumerary's station while holding PTT switch in RADIO position
- From one Steward's station with telephone handset switch pressed.
- From ground telephone microphone at ground service jack.

(e1) Check quality of voice communications

(f) Hook up telephone handset at Steward's station.

D. Close-Up

(1) Disconnect ground telephone equipment from ground service jack used.

(2) At Flight Engineer's station

(a) Place SERVICE I/PHONE FLIGHT-GROUND switch in FLIGHT position.

(b) Disconnect boomset on jack panel and put it back into test set.

(c) Disconnect junction cable at location of oxygen box, disconnect hand microphone and put junction cable and hand microphone back into test set.

(d) On audio selector panel
- Disengage INT reception push-button
- Make certain that INT-R/T PTT switch is in intermediate position
- Make certain that BOOM-MASK switch is in BOOM position

(e) Place LIGHTING PANEL ocntrol in OFF position

(3) At Second Supernumerary's station

(a) Disconnect boomset on jack panel and put it back into test set.

(b) Disconnect junction cable at location of oxygen box, disconnect hand microphone and put junction cable and hand microphone back into test set.

(c) Place ON-OFF PTT switch in OFF position

(4) At First Supernumerary's station

(a) Make certain that RAD-INT PTT switch is in intermediate position.

(b) Disconnect boomset on jack panel and put it back into test set.

(c) Disconnect junction cable at location of oxygen box, disconnect hand microphone and put junction

cable and hand microphone back into test set.

(d) Place LIGHT CONTROL switch in OFF position.

(e) On audio selector panel :
- Disengage INT reception push-button
- Make certain that INT-R/T PTT switch is in intermediate position
- Make certain that BOOM-MASK switch is in BOOM position.

(5) On overhead panel 4-211

(a) Turn LIGHTING CENTRE CONSOLE PANEL knob fully counterclockwise.

(b) Place I/PHONE CABIN-NORMAL switch in NORMAL position.

(6) On Captain's console 1-211 and on First Officer's console 1-212.

(a) Make certain that LOUDSPEAKER ON-OFF switch is in OFF position.

(b) Disconnect junction cable at location of oxygen box, disconnect hand microphone and put junction cable and hand microphone back into test set.

(c) Disconnect boomset on jack panel and put it back into test set.

(d) Place LH CONSOLE and RH CONSOLE controls in OFF position.

(7) On Captain's and First Officer's audio selector panels

(a) Engage INT reception push-button

(b) Make certain that BOOM-MASK switch is in BOOM position.

(c) Make certain that INT-R/T PTT switch is in intermediate position.

(8) Stop electronics rack ventilation (Ref. 21-20-00).

(9) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

4. Power Measurement

NOTE : The following measurement procedures are given for reference only. Whenever used, they will be included in the system test described at the end of paragraph 3.C.

A. Equipment and Materials

DESCRIPTION	PART NO.
600 Ohm Audio O/P Meter	
Audio Signal Generator O/P > 2mV - 600 Ohm Impedance 1000 Hz Frequency	
600 Ohm Audio Loads for Crew Members' Network	
600 Ohm Audio Loads for Stewards' Network	

B. Prepare

(1) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels, make certain that :

(a) All transmission keys are disengaged.

(b) All reception push-buttons are disengaged.

(c) BOOM-MASK switch is in BOOM position.

(d) VOICE filter push-button is disengaged.

(e) INT-R/T PTT switch is in intermediate position.

(2) Make certain that RAD-INT PTT switch is in intermediate position on the following :

(a) Captain's and First Officer's control column handwheels.

(b) First Supernumerary's panel 3-213.

(3) On Second Supernumerary's panel 20-215, make certain that :
- BOOM-MASK switch is in BOOM position

- ON-OFF PTT switch is in OFF position

(4) On panel 4-211, make certain that I/PHONE NORMAL-CABIN switch is in NORMAL position.

(5) On Flight Engineer's panel 29-214, make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(6) On Captain's, First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels :

(a) Connect a headset or a 600 ohm audio load to relevant HEADSET jack.

C. Tests

(1) Measurement of Crew Members' network power.

(a) On Captain's jack panel, connect audio generator to MIC jack and feed with a 1.6 mV - 1000 Hz signal on a 300 ohm load.

(b) On Captain's jack panel, disconnect headset or 600 ohm load and replace by 600 ohm wattmeter.

(c) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panel, press INT reception push-button and turn integral potentiometer fully clockwise.

(d) On Captain's control column handwheel, place RAD-INT PTT switch in INT position and make certain that :
- Reading on wattmeter is 20 ± 1 mW and then place PTT switch in intermediate position.

(e) On Captain's jack panel, disconnect wattmeter and replace it by a 600 ohm audio load or a head-set.

(f) Repeat operations 4. C. (1) (b) to 4. C. (1) (e) from First Officer's, Flight Engineer's and First Supernumerary's jack panels and audio selector panels.

(g) At Second Supernumerary's station, repeat operation 4.C. (1) (b) and place ON-OFF PTT switch in ON position. Reading on wattmeter should be 20 ± 1 mW.

(h) At Second Supernumerary's station, place PTT switch in OFF position and repeat operation 4.C. (1) (e).

NOTE : Second Supernumerary's panels are controlled from Flight Engineer's station.

(2) Measurement of Stewards' network power.

(a) Repeat operation 4. C. (1) (a).

(b) On panel 4-211, place I/PHONE NORMAL-CABIN switch in CABIN position.

(c) At Steward's station 1, in zone 221, disconnect telephone handset and connect wattmeter to pins 1 and 4 of connector on panel.

(d) On Captain's control column handwheel, place RAD-INT PTT switch in INT position and make certain that :
- Reading on wattmeter is 20 ± 2 mw and then place PTT switch in intermediate position.

(e) At Steward's station 1, in zone 221, disconnect wattmeter and connect telephone handset.

(f) Repeat operations 4. C. (2) (c) to 4. C. (2) (e) at Steward's stations 2 and 3 (Zones 223 and 241).

D. Close-Up

(1) On Captain's jack panel, disconnect test equipment :

(a) Audio generator from MIC jack.

(b) Headset or 600 ohm audio load from HEADSET jack and put back into test set.

(2) On First Officer's, Flight Engineer's, First and Second Supernumerary's jack panels :

(a) Disconnect headset or 600 ohm audio load from HEADSET jack and put back into test set.

(3) At Steward's station 3 (Zone 241), disconnect wattmeter and connect telephone handset to jack.

(4) On Captain's, First Officer's, Flight Engineer's and First Supernumerary's audio selector panels :

(a) Disengage all reception push-buttons.

(b) Make certain that no transmission key is engaged.

(c) Make certain that INT-R/T PTT switch is in intermediate position.

(5) On Second Supernumerary's panel 20-215, make certain that :

(a) ON-OFF PTT switch is in OFF position.

(6) On Captain's console 1-211 :

(a) Make certain that LOUDSPEAKER ON-OFF switch is in OFF position.

(b) Place LH CONSOLE control in OFF position.

(7) On First Officer's console 1-212 :

(a) Make certain that LOUDSPEAKER ON-OFF switch is in OFF position.

(b) Place RH CONSOLE control in OFF position.

(8) On panel 4-211 :

(a) Make certain that I/PHONE CABIN-NORMAL switch is in NORMAL position.

(b) Turn LIGHTING CENTRE CONSOLE PANEL knob fully counterclockwise.

(9) On First supernumerary's panel 3-213 :

(a) Place LIGHT CONTROL switch in OFF position.

(b) Make certain that RAD-INT PTT switch is in intermediate position.

(10) On Captain's and First Officer's control column hand-wheels, make certain that RAD-INT PTT switches are in intermediate position.

(11) On Flight Engineer's console :

(a) On panel 29-214, make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(b) On panel 11-214, turn LIGHTING CONTROL knob

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fully counterclockwise.

(12) Disconnect test equipment and ground telephone equipment from ground service jacks and put back into test set.

(13) Stop electronics rack ventilation (Ref. 21-21-00)

(14) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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END OF THIS SECTION

NEXT

AUDIO - SELECTOR PANEL - REMOVAL/INSTALLATION

1. General

Four audio selector panels are installed on the aircraft. Captain's (R53) and First Officer's (R54) audio selector panels are located on upper centre console 7-211.
Flight Engineer's audio selector panel (R56) is located on Flight Engineer's panel 8-214. First Supernumerary audio selector panel (R55) is located at Flight Engineer's station, on panel 7-213.

2. Removal - Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Connector Plugs	

B. Prepare

(1) Trip, safety and tag the following circuit breakers according to audio selector panel (s) to be removed.

(a) For Captain's and First Officer's audio selector panel :

- No. 1 INPH SUP - 1-213 R89 K19
- No. 2 INPH SUP - 3-213 R90 H 2
- INPH SUP - 25-216 R102 D 2
- CTR CONSOLE INST LTS SUP - 14-216 L405 B 8

(b) For Flight Engineer's and First Supernumerary's audio selector panels :

- No. 1 INPH SUP - 1-213 R89 K19
- No. 2 INPH SUP - 3-213 R90 H 2
- LH CONSOLE INST LTS SUP - 14-215 L374 B11
- 3CM LH INST LTS SUP - 13-216 L377 E 8

C. Remove

Refer to paragraph 3.D. in 23-00-00, Removal/Installation.

D. Preparation of Replacement Component

Refer to paragraph 3.E. in 23-00-00, Removal/Installation.

E. Install

Refer to paragraph 3.F. in 23-00-00, Removal/Installation.

F. Test

(1) Remove safety clips and tags and reset circuit breakers corresponding to the audio selector panel (s) installed, previously tripped in paragraph 2.B. (1).

(2) Carry out audio selector panel test (Ref. 23-41-21, Adjustment/Test).

G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

AUDIO SELECTOR PANEL - ADJUSTMENT/TEST

1. General

Test of the audio selector panel (s) after removal or replacement. The test will be performed with the jack panel corresponding to the audio selector panel tested.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
1 Boomset	A/C Equipment
1 Ground Telephone Equipment	From Test Set TE 2047000
1 Electrical Ground Power Unit	

B. Prepare

(1) At Flight Engineer's station (zone 214), on panel 29-214, make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(2) On jack panel corresponding to the audio selector panel to be tested :

- connect the boomset
- place the switch in BOOM position

(3) On Captain's and First Officer's consoles make certain that LOUDSPEAKERS switches are placed in OFF position.

(4) Make certain that all RAD-INT PIT switches are placed in intermediate position.

(5) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
No.2 INPH SUP	3-213	R 90	H 2
LH CONSOLE INST LTS SUP	14-215	L374	B11
3CM LH INST LTS SUP	13-216	L377	E 8
CTR CONSOLE INST LTS SUP	14-216	L405	B 8
RH CONSOLE INST LTS SUP		L373	E 8

(6) Connect electrical ground power unit, and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(7) Operate electronics rack ventilation (Ref. 21-21-00).

C. Tests

(1) Test of lighting circuits

(a) Place the following switches in ON position.
- LH CONSOLE switch on Captain's console 1-211
- RH CONSOLE switch on First Officer's console 1-212
- LIGHT CONTROL switch on panel 3-213

(b) Turn lighting knobs clockwire :
- LIGHTING CENTRE CONSOLE PANEL on panel 4-211
- LIGHTING PANEL on Flight Engineer's panel 11-214

(c) On each jack panel, make certain that integral lighting is in correct operatring condition.

(d) On each audio selector panel, check that :
- integral lighting is in correct operating condition
- the keys and the reception push-buttons will illuminate as soon as they are operated.

(2) Voice communication between audio selector panel and interphone box.

(a) On nose landing gear leg, connect a ground tele-

phone equipment with headset to one of the two interphone box jacks.

(b) On audio selector panel concerned :
- place INT-R/T PTT switch in INT position
- engage INT reception push-button and place potentiometer in intermediate position.

(c) Speak into boomset station concerned and make certain that voice is received at ground telephone headset.

(d) Speak into microphone of ground telephone headset and make certain that voice is received at boomset of station concerned.

(3) Voice communication between audio selector panel and Steward's station 1.

(a) On overhead panel 4-211, place I/PHONE CABIN-NORMAL switch in CABIN position.

(b) On audio selector panel concerned make certain that :
- INT R/T PTT switch is placed in INT position
- INT reception push-button is engaged.

(c) At Steward's station 1 (zone 221), take hold of telephone handset.

(d) At station concerned :
- speak in boomset microphone and make certain that voice is received at telephone handset at Steward's station 1.
- On audio selector panel place INT-R/T PTT switch in intermediate position.

(e) At Steward's station 1, speak into telephone handset while pressing PTT switch and make certain that voice is received at boomset of station concerned.

(f) At Steward's station 1, hook up telephone handset.

(g) On overhead panel 4-211, place I/PHONE CABIN-NORMAL switch in NORMAL position.

(h) On audio selector panel concerned, disengage INT reception push-button.

D. Close-Up

(1) Turn, fully counterclockwire lighting knobs :

(a) LIGHTING CENTRE CONSOLE PANEL on panel 4-211

(b) LIGHTING PANEL on panel 11-214.

(2) Place the following switches in OFF position

(a) LH CONSOLE on Captain's console 1-211

(b) RH CONSOLE on First Officer's console 212

(c) LIGHT CONTROL on panel 3-213.

(3) Stop electronics rack ventilation (Ref. 21-21-00).

(4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(5) On nose landing gear leg, disconnect ground telephone equipment from interphone box.

INTERPHONE AMPLIFIER - REMOVAL/INSTALLATION

1. General

Interphone amplifier (R62) is installed in RH electronics rack, on shelf 5-216.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Connector Blanking Plugs/ Caps	
Outlet Blanking Plates	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH. SUP	1-213	R89	K19
No.2 INPH. SUP	3-213	R90	H 2
INPH SUP	25-216	R102	D 2

(2) On RH electronics rack, remove panel 216ES to gain access to shelf 5-216.

C. Remove

Refer to paragraph 2.D. (23-00-00, Removal/Installation).

D. Preparation of Replacement Component

Refer to paragraph 2.E. (23-00-00, Removal/Installation).

E. Install

Refer to paragraph 2.F. (23-00-00, Removal/Installation).

F. Test

(1) Remove safety clips and tags and reset circuit breakers previously tripped in paragraph 2.B. (1).

(2) Carry out a test with audio selector panels (Ref. 23-41-21, Adjustment/Test).

G. Close-Up

Install panel 216ES on RH electronics rack.

JACK PANEL - REMOVAL/INSTALLATION

1. General

Five jack panels are installed on the aircraft Captains's jack panel is located on LH console 1/211.
First Officer's jack panel is located on RH console.
Flight Engineer's jack panel is located on Flight Engineer's panel 8-214.
First Supernumerary jack panel is located on Flight Engineer's panel 7-213 (LH).
Second supernumerary jack panel is located on electronics rack 215, panel 20-215.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Connector Blanking Plugs/ Caps	

B. Prepare

(1) Trip, Safety and tag the following circuit breakers as appropriate :

(a) For Captains First and Second Supernumerary's jack panel :
- LH CONSOLE INST LTS SUP 14-215 - L374 - B11

(b) For First Officer's jack panel :
- RH CONSOLE INST LTS SUP 14-216 - L373 - E 8

(c) For Flight Engineer's jack panel :
- 3CM LH INST LTS SUP - 13-216 - L377 - E 8

C. Remove

Refer to paragraph 3.D. (23-00-00, Removal/Installation).

D. Preparation of Replacement Component

Refer to paragraph 3.E. (23-00-00, Removal/Installation).

E. Install

Refer to paragraph 3.F. (23-00-00, Removal/Installation).

F. Test

(1) Remove safety clips and tags and reset circuit breakers previously tripped in paragraph 2.B. (1).

(2) Carry out a test with the associated audio selector panel (23-41-21, Adjustment/Test).

NOTE : Test of the Second Supernumerary's jack panel will be directly performed with nose gear leg interphone box.

G. Close-Up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

MAIN GEAR LEG GROUND SERVICE JACK - REMOVAL/INSTALLATION

1. General

Removal for replacement of jack or of jack cover.
Two ground service jacks (R77 and R78) are installed respectively on the LH and RH main landing gear legs. As installation of these jacks is identical, a single removal/installation procedure common to the two jacks will be described.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform	
Lockwire	

B. Prepare

CAUTION : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

(1) On Flight Engineer panel 29-214, make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
No.2 INPH SUP	3-213	R 90	H 2

(3) Position access platform in working area :

REF	DESCRIPTION	PANEL	ACCESS ZONE	ACCESS DOOR
R77	LH Main Landing Gear Leg		733	None
R78	RH Main Landing Gear Leg		743	None

C. Remove (Ref. Fig. 401)

(1) On main gear leg (LH or RH), remove lockwire and disconnect aircraft wiring from jack connector.

(2) Remove the two screws attaching jack to main gear leg and remove jack cover.

(3) Turn to unlock and remove plug (1) from jack cover (9).

(4) Remove lockwire and remove the four screws (11) attaching connector (10) to jack cover.

(5) Gently pull out connector (10) to gain access to pins.

(6) Disconnect the three wires (8) from pins and remove connector (10).

(7) Remove retaining ring (2) from inside jack cover.

(8) Pull out attachment washer (5) supporting jack (7).

(9) Remove nut (3) and retain insulating washer (4), attachment washer (5) and insulating washer (6).

(10) Remove jack (7).

(11) Disconnect wires from the three jack terminals.

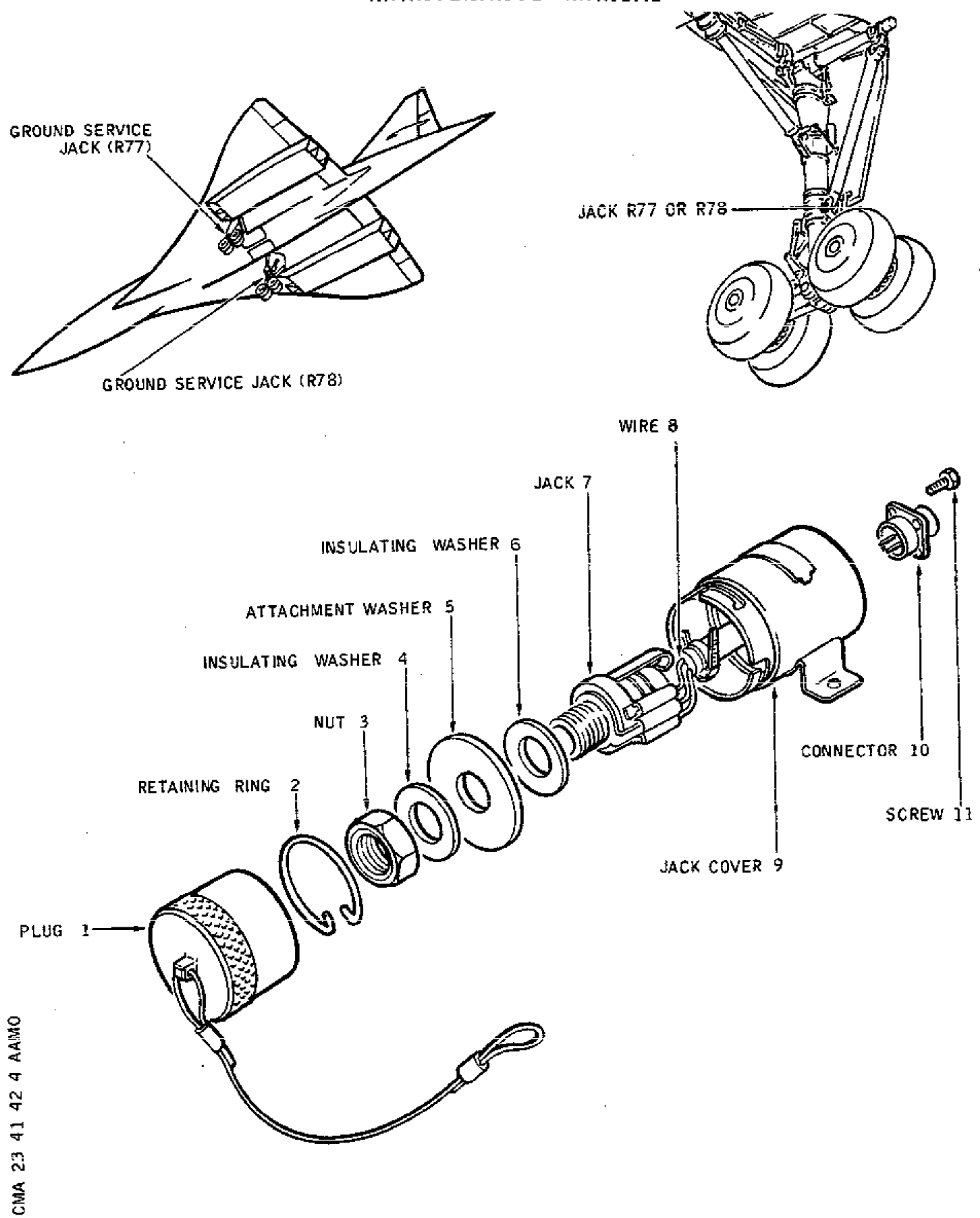
D. Preparation of Replacement Component

(1) On jack, make certain :

(a) That terminals are in correct condition and that there are no signs of deterioration or oxidation.

(b) That the two insulating washers (4 and 6) and nut (3) are mounted on jack.

(2) On jack cover connector, make certain that pins are in correct condition and that there are no traces of



Main Gear Leg Ground Service Jack -
Removal/Installation
Figure 401

corrosion.

E. Install (Ref. Fig. 401)

(1) Connect the three wires (8) to jack terminals, as follows.

(a) Blue wire to HEADPHONE terminal.

(b) Red wire to MICRO terminal.

(c) Green wire to COMMON terminal.

(2) Position insulating washer (6), attachment washer (5), insulating washer (4) and nut (3) on jack. Tighten nut.

(3) Position attachment washer (5) in groove in jack cover (9).

(4) Position retaining ring (2) in groove in jack cover.

(5) Connect the three wires (8) to pins of connector (10), as follows.

(a) Blue wire to pin A (headphone).

(b) Red wire to pin B (microphone).

(c) Green wire to pin C (common).

(6) Position connector (10) on jack cover (9) and attach with the four screws (11). Safety screws with lockwire.

(7) Install and lock plug (1) on jack cover (9).

(8) Position jack cover on main gear leg and attach with its two screws.

(9) Connect aircraft wiring to jack cover connector and safety connectors with lockwire.

F. Close-Up

(1) Carry out a test of ground service jacks (Ref. 23-41-44, Adjustment/Test).

(2) Remove access platform from working area.

INTERPHONE BOX - REMOVAL/INSTALLATION

WARNING : OBSERVE THE ELECTRICAL SAFETY PRECAUTIONS DETAILED IN CHAPTER 24-00-00, SERVICING.

1. General

The interphone box, with ground service telephone connected to it, enables ground personnel to have voice communication with the crew stations.
It is located on the nose gear leg, LH side, below the telescopic drag strut hinge point.

2. Interphone Box

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	
Corrosion Resistant Steel Lockwire	0.6 mm (0.024 in.)
Ground Service Telephone with Headset	
Special Materials (Ref. 20-30-00 No. 106) Wheel Chocks	

B. Prepare

(1) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R89	K19
No.2 INPH SUP	3-213	R90	H 2
GROUND CALL HORN	16-215	H1216	No set position
NOSE WHEEL STEERING SUP	15-216	G93	A18

C. Remove (Ref. Fig. 401)

(1) Disconnect and cap electrical connectors.

(2) Cut and remove lockwire, remove screws (1). Remove interphone box.

D. Preparation of Replacement Component

(1) On removed interphone box :

(a) Remove pin C22646.

(b) Cut and remove lockwire, remove screws (3). Remove microswitch (2).

(2) On replacement interphone box :

(a) Bring back control lever to vertical position and insert pin C22646.

(b) Check distance X of bolt (4).
The distance must be 1.5 ± 0.3 mm
(0.059 ± 0.011 in.)
Adjust bolt (4), if necessary, by :
- loosening locknut (5) and moving bolt (4) in the direction and to the extent required
- adjusting and tightening locknut (5)

(c) Apply Special Material No.106 to screws (3).

(d) Position microswitch (2) and secure by means of screws (3). Safety with lockwire, (Ref. 20-21-13).

E. Install

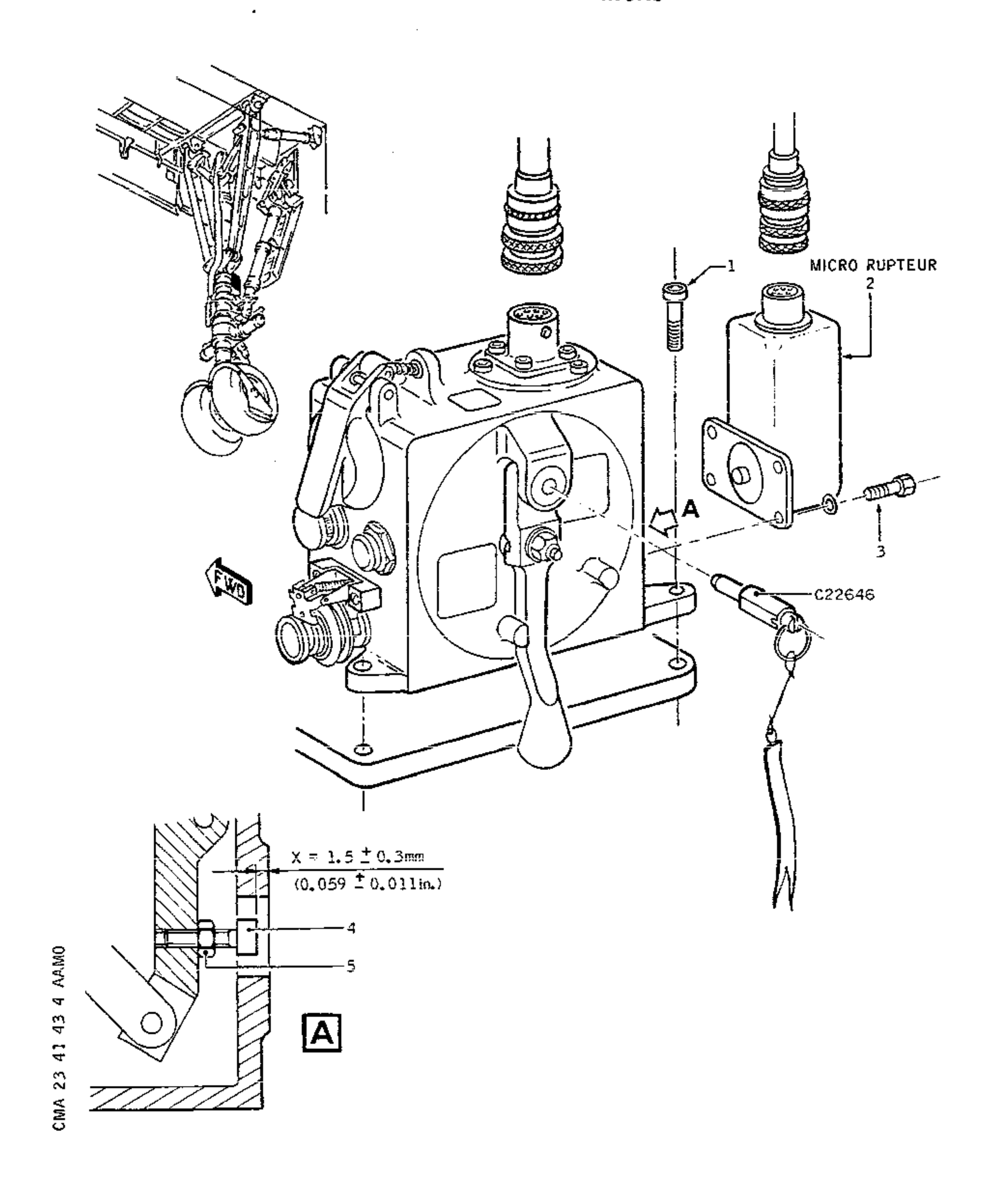
(1) Install interphone box and secure with screws (1). Safety screws with lockwire (Ref. 20-21-13).

(2) Connect electrical connectors.

(3) Remove safety clips and tags, and reset circuit breakers.

F. Tests

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).



Interphone Box
Figure 401

(2) Operate electronics racks ventilation system (Ref. 21-21-00).

(3) On interphone box upper connector, connect ground service telephone.

(4) Test of ground call system.

(a) On panel 4-211, press GRND CALL push-button,
- the ground call horn located in the nose gear bay sounds, and call light on interphone box illuminates.

(b) On interphone box, press call push-button,

- integrally lighted ground call push-button on panel 4-211 illuminates.

(5) Test of interphone system.

(a) Unhook telephone handset at one of the three Stewards stations, engage push-to-talk switch and speak into hand microphone. Check that signal is received at ground service telephone headset.

(b) Speak into ground service telephone microphone and make certain that signal is received at previously selected Steward's station.

(6) Test of Microswitch

(a) Make certain that nose gear wheels are aligned and steering control handle is at zero.

(b) Pressurize Green hydraulic system (Ref. 29-11-00, Servicing)

(c) Check illumination of :

(c1) STEERING warning lights located on panels 3-211 and 3-212

(c2) NOSE WHEEL warning light located on First Officer's panel 2-212

(d) On interphone box, remove key C22646 :

(d1) STEERING and NOSEWHEEL warning lights extinguish

(e) Return interphone box control lever to vertical position and re-insert key C22646

(e1) STEERING and NOSE WHEEL warning lights illuminate

(f) Shut down and depressurize Green hydraulic system (Ref. 29-11-00).

G. Close-up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Stop electronics rack ventilation (Ref. 21-21-00)

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

GROUND SERVICE JACKS - REMOVAL/INSTALLATION

1. General

Removal for replacement of on or move grand service jacks. Installation of the fuselage mounted ground service jacks is identical ; a single removal/installation procedure common to all these jacks will be described.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Access Platform (height depending on jack to be replaced)	
Special Material (Ref. 20-30-00, No.109)	
Special Material (Ref. 20-30-00, No.120)	
Cable Tie	
Shrink Sleeve	

B. Prepare

(1) On Flight Engineer panel 29-214, make certain that SERVICE I/PHONE FLIGHT-GROUND switch is in FLIGHT position.

(2) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
No.2 INPH SUP	3-213	R 90	H 2

(3) Position access platform and open access door corres-

ponding to jack as per following table :

GROUND SERVICE JACK	LOCATION	ACCESS ZONE	ACCESS DOOR
R73	Droop nose - RH	114	113BB
R74	Near ground power connector	128	128AB
R76	Radar bay	124	123AB
R79	Near LH engine 2 air intake	421	421LB
R80	Near RH engine 3 air intake	431	431LB
R81	Tail cone	314	313BB
R82	Aft RH electronics rack	244	843
R83	Baggage compartment	132	131AZ
R84	Baggage compartment	132	131AZ
R85	Air conditioning bay (FR68)	152	151CB
R86	Hydraulics bay (FR70b)	151	151DB
R87	Hydraulics bay (FR74)	154	153BB
R88	Passenger compartment (FR78)	244	844
R95	INS rack 12=123	123	123BB
R96	Refuel control unit, RH wing lower fairing	194	194JB

C. Remove (Ref. Fig. 401)

(1) Raise and hold cap (4).

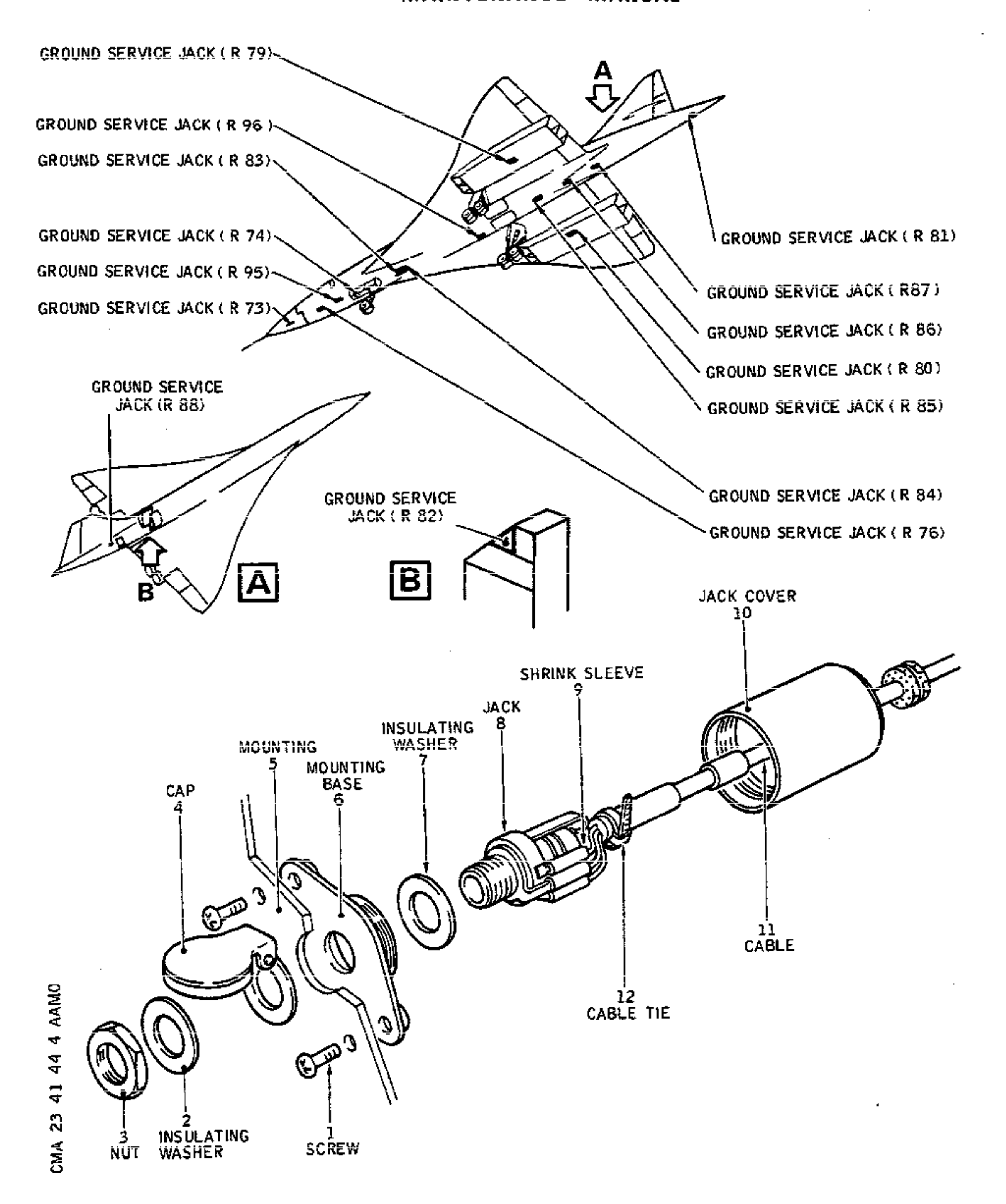
(2) Remove nut (3) and retain insulating washer (2).

(3) Remove cap (4).

(4) Remove the two screws (1).

(5) Free mounting base (6) from mounting (5).

(6) Remove mounting base (6) from jack cover (10).



Fuselage Mounted Ground Service Jack - Removal/Installation
Figure 401

(7) Remove insulating washer (7).

(8) Gently pull out jack (8) and cable (11) from jack cover (10).

(9) Remove cable tie (12).

(10) Slide shrink sleeves (9) back from jack terminals.

(11) Disconnect cable (11) from the three jack terminals and remove shrink sleeves.

(12) Remove jack (8).

D. Preparation of Replacement Component

(1) Clean threads of jack cover (10) and of mounting base (6) to remove any traces of locking material.

(2) On jack, make certain

(a) That terminals are in correct condition and that these are no signs of oxidation or deterioration.

(b) That the two insulating washers (2 and 7), nut (3) and cap (4) are mounted on jack.

E. Install (Ref. Fig. 401)

(1) Slide shrink sleeves (9) outs the three wires of cable (11).

(2) Connect cable (11) to the three jack terminals, as follows.

(a) Blue wire to HEADPHONE terminal.

(b) Red wire to MICRO terminal.

(c) Green wire to COMMON terminal.

(3) Slide shrink sleeves (9) forwards to cover jack terminals.

(4) Install cable tie (12).

(5) Gently insert jack (8) with cable (11) in jack cover (10).

(6) Position insulating washer (7) on jack.

(7) Coat first threads of jack cover (10) and of mounting base (6) with Material Nos. 109 and 120 and install jack cover on mounting base.

(8) Position mounting base (6) on mounting (5) and attach with screws (1).

(9) Coat ring of cap (4) with Material Nos.109 and 120 and position ring in seating against mounting base (6).

(10) Lift and hold cap (4), position insulating washer (2) and nut (3) on jack and tighten nut.

(11) Release cap (4) and make certain that it falls and position correctly.

F. Close-Up

(1) Carry out a test of ground service jacks (Ref. 23-41-44, Adjustment/Test).

(2) Remove access platform from working area.

GROUND SERVICE JACKS - ADJUSTMENT/TEST

1. General

Check of correct operation of ground service jacks circuit after replacement of one or more elements of system.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Ground Telephone Equipment with Headset	

B. Prepare

(1) Connect ground telephone equipment to ground service jack to be checked.

(2) Remove safety clips and tags and set the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
No.2 INPH SUP	3-213	R 90	H 2

(3) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(4) Switch on electronics rack ventilation system (Ref. 21-21-00).

C. Test

(1) On Flight Engineer panel 29-214 place SERVICE I/PHONE FLIGHT-GROUND switch in GROUND position.

(2) Pick up telephone handset at one of the steward stations and speak into it while pressing PTT switch ;

check that voice is heard at ground telephone equipment headset.

(3) Speak into ground telephone equipment microphone and check that voice is heard at steward station handset.

(4) Replace steward station handset.

(5) On Flight Engineer panel, place SERVICE I/PHONE FLIGHT-GROUND switch in FLIGHT position.

D. Close-Up

(1) Switch off electronics rack ventilation system (Ref. 21-21-00).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) Disconnect and stow ground telephone equipment and headset.

GROUND CALL - DESCRIPTION AND OPERATION

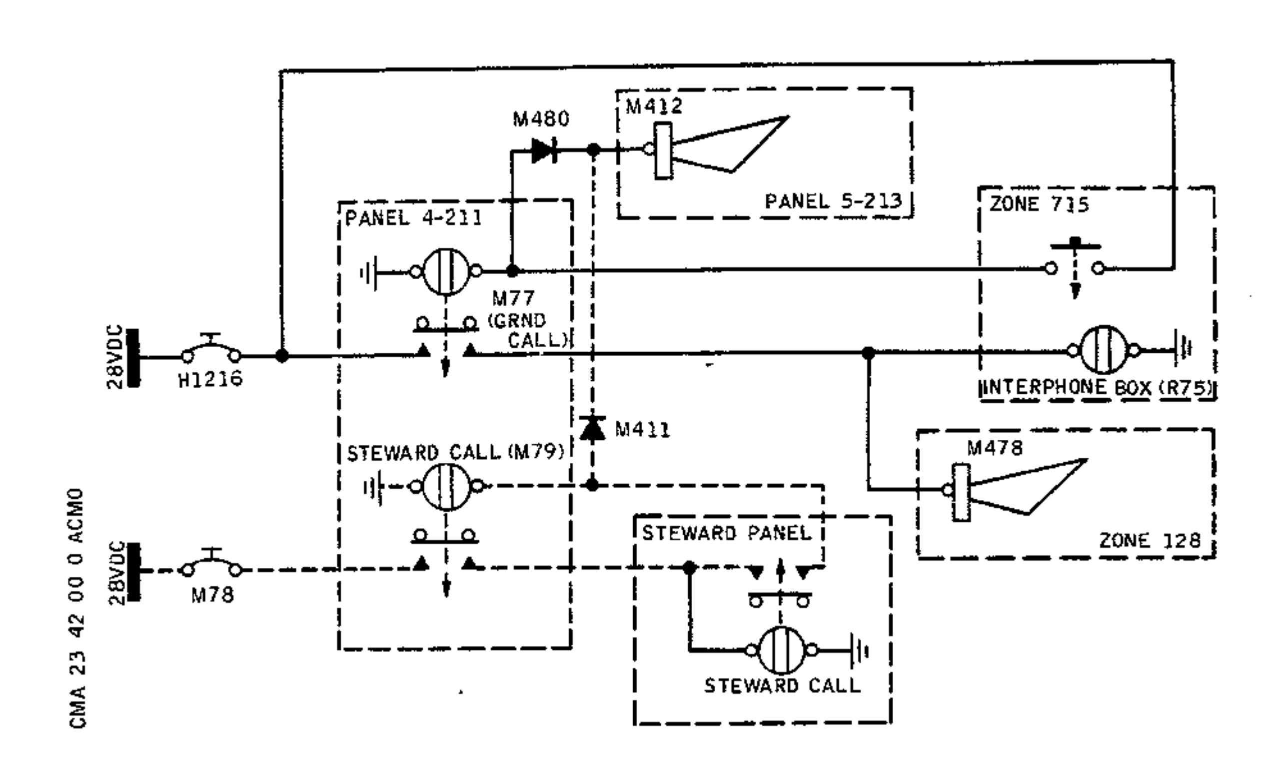
1. General

The ground call system signals by means of visual or aural warnings that a crew member wishes to establish communication with the ground personnel or vice versa.

2. System Components

R **ON A/C 006-007,
(Ref. Fig. 001)

R **ON A/C 006-007,

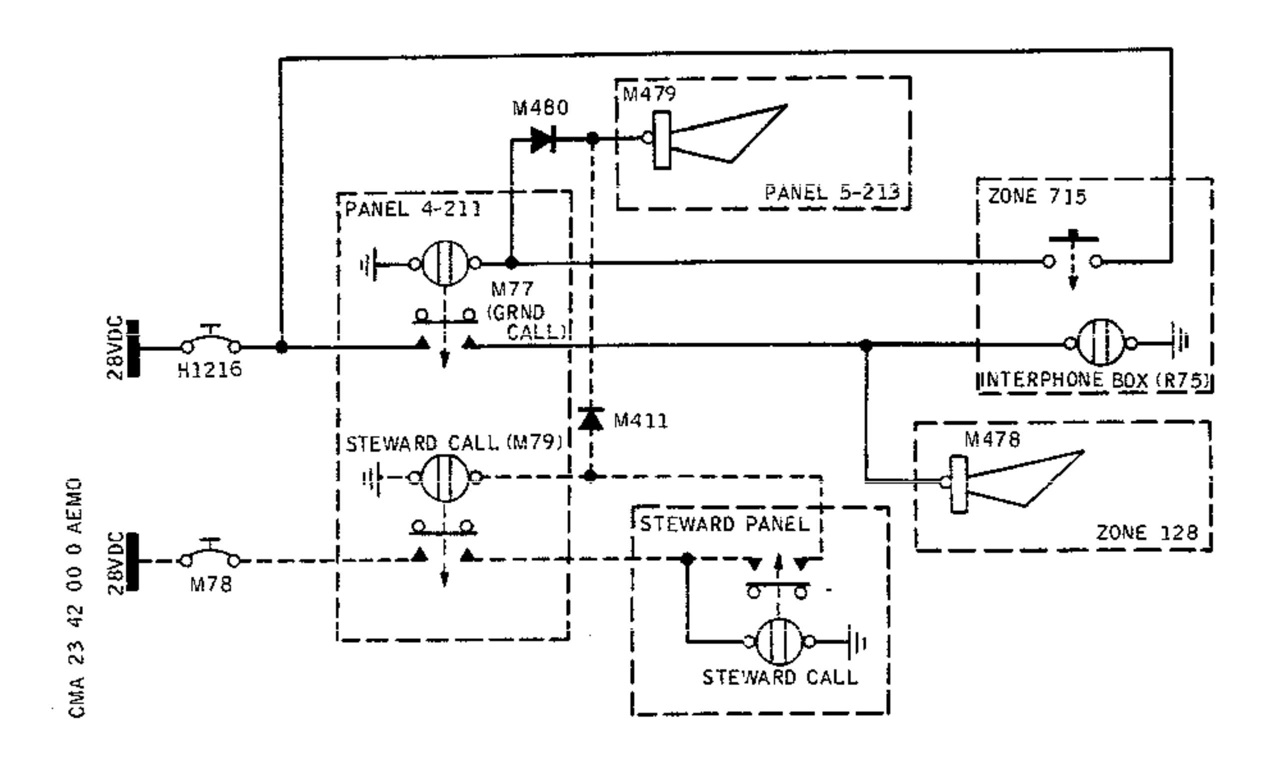


Ground Call System - Schematic
Figure 001

- 1 ground call horn (M478)
- 1 Captain GRND CALL indicator light switch (M77)
- 1 call light and a call switch on interphone box (R75)
- 1 audible indicator (M412)
- 2 diodes (M480 - M411)

**ON A/C 001-005,
(Ref. Fig. 002)

**ON A/C 001-005,



Ground Call System - Schematic
Figure 002

- 1 ground call horn (M478)
- 1 audible indicator (M479)
- 1 Captain GRND CALL indicator light/switch (M77)
- 1 call light and a call switch on interphone box (R75).

3. System Operation

With circuit breaker (H1216) set, the ground call system is con= nected. It is a two-way call circuit allowing crew members to call a ground mechanic and vice versa.

A. Call from flight compartment to ground mechanic.

With GRND CALL indicator light/switch (M77) at panel 4-211 held pressed by a crew member, a + 28VDC signal is fed to :

- the call light, located on interphone box (R75) on nose gear leg, which illuminates and enables the visual call.

R - the ground call horn (M478) located in nose gear bay at
R zone 128 which sounds and enables the aural call.

Thus the crew member concerned may establish communication with the ground mechanic.

B. Call from ground mechanic to flight compartment

With the call switch on interphone box (R75) held pressed, a + 28VDC signal is applied to :

(1) - the GRND CALL indicator light/switch (M77) at panel 4-211, which illuminates, providing the visual call.

**ON A/C 001-005,

(2) - the audible indicator (M479) at panel 5-213, which sounds, providing the aural call.

**ON A/C 006-007,

(2) - the audible indicator (M412) at panel 5-213, which sounds, providing the aural call.

Thus the ground mechanic may establish communication with the crew members.

NOTE 1 : During this operation, diode (M411) cuts off the ground call 28VDC signal to the STEWARD CALL light (on panel 4-211) which remains extinguished.

NOTE 2 : At one of the Steward's panels, when the STEWARD CALL indicator light/switch is held pressed, a +28VDC signal is applied to :

- the STEWARD CALL light which illuminates on panel 4-211
- the audible indicator (M479) which sounds through diode (M411).
- diode M480 which blocks the +28VDC signal, thus avoiding illumination of GRND CALL indicator light/switch (M77).

GROUND CALL - TROUBLE SHOOTING

WARNING : OBSERVE THE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING.

1. General

The following trouble shooting procedures are intended to enable faults found in the ground call system to be quickly rectified. The defects can be isolated with the aid of the trouble shooting procedures and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be necessary. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure the operation is OK.
Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101). The table provides information including component location required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

NOTE : The trouble shooting procedure is to be performed with aircraft on the ground, landing gear extended and shock absorbers compressed.

A. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUND CALL	16-215	H1216	
PASS. CALL SUP	15-216	M 78	A22

B. Connect electrical ground power unit and energize the aircraft electrical network. (Ref. 24-41-00, Servicing).

3. Trouble Shooting

A. Call from flight compartment

```
****************************************************
* On panel 4-211, press GRND CALL indicator light/  *
* switch (M77) [1] :                                *
* - The call light on interphone box (R75) [2] loca-*
*   ted on nose gear illuminates.                   *
* - The ground call horn (M478) [3] located in nose *
*   gear bay sounds.                                *
****************************************************
    ||    |
    ||    |        -----------------------------------------------
    OK    NOT OK----| The call light does not illuminate on inter- |
    ||    |         | phone box. Ref. Chart 101.                   |
    ||    |        -----------------------------------------------
    ||    |
    ||    |        -----------------------------------------------
    OK    NOT OK----| The ground call horn does not operate.       |
    ||              | Ref. Chart 102.                              |
    ||             -----------------------------------------------
    ||
    ||
****************************************************
* The ground call system is operational from the    *
* flight compartment.                               *
****************************************************
```


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B. Call from the ground mechanic interphone box

```
*****************************************************
* On interphone box (R75) [2] located on nose gear, *
* press call switch and check that :                *
* (1) On panel 4-211 :                              *
*      - GRND CALL indicator light/switch (M77) [1] *
*        illuminates                                *
*      - STEWARD CALL light is extinguished.        *
* (2) On panel 5-213, the audible indicator         *
*      [4] sounds.                                  *
*****************************************************
    ||    |
    ||    |       ------------------------------------------------
    ||    |      | GRND CALL indicator light/switch does not illu-|
    OK    NOT OK----| minate. Ref. Chart 103.                     |
    ||    |       ------------------------------------------------
    ||    |
    ||    |       ------------------------------------------------
    OK    NOT OK----| STEWARD CALL light illuminates. Ref. Chart 104.|
    ||    |       ------------------------------------------------
    ||    |
    ||    |       ------------------------------------------------
    ||    |      | The audible indicator does not operate.        |
    OK    NOT OK----| Ref. Chart 105.                             |
    ||            ------------------------------------------------
    ||
    ||
*****************************************************
* The ground call system is operational from inter- *
* phone box.                                        *
*****************************************************
```

```
**************************************--------------------------------
* THE CALL LIGHT DOES NOT ILLUMINATE *| GROUND EQUIPMENT REQUIRED    |
* ON INTERPHONE BOX.                 *|------------------------------|
**************************************| DESCRIPTION        PART NO.  |
                                      |------------------------------|
                                      | MULTIMETER                   |
                                      --------------------------------

*****************************************************
* The ground call horn [3] located in nose gear bay *
* sounds.                                           *
*****************************************************
   |     |
   |     |       ---------------------------------------------
   |     |      | On interphone box [2], replace bulb of call |
  NO    YES------| light.                                      |
   |             ---------------------------------------------
   |
*****************************************************
* Press call switch on interphone box [2].          *
* - On panel 4-211, GRND CALL indicator light/switch*
*   [1] illuminates.                                *
* - On panel 5-213, the audible indicator [4] sounds*
*****************************************************
   |     |
   |     |       ---------------------------------------------
   |     |      | Trip circuit breaker [5]. On panel 4-211,   |
  NO    YES------| replace indicator light/switch [1].         |
   |             ---------------------------------------------
   |
-----------------------------------------------------
| Check 28VDC at output of circuit breaker [5].     |
-----------------------------------------------------
                        |
                      NOT OK
                        |
-----------------------------------------------------
| Replace circuit breaker [5].                      |
-----------------------------------------------------
```

Chart 101

```
*************************************
* THE GROUND CALL HORN DOES NOT SOUND*
*************************************

*****************************************************
* The call light on interphone box [2] illuminates. *
*****************************************************
                         |
                        YES
                         |
    ------------------------------------------
    | Replace ground call horn [3].          |
    ------------------------------------------
```

Chart 102

```
*************************************
* GRND CALL INDICATOR LIGHT/SWITCH   *
* DOES NOT ILLUMINATE.               *
*************************************

****************************************************
* On panel 5-213, the audible indicator [4] sounds  *
****************************************************
    |     |
    |     |       ------------------------------------------------
    |     |       | On panel 4-211, replace bulb of indicator    |
   NO    YES------| light/switch [1].                            |
    |             ------------------------------------------------
    |
----------------------------------------------------
| Replace interphone box [2].                      |
----------------------------------------------------
```

Chart 103

STEWARD CALL LIGHT ILLUMINATES

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

Trip circuit breakers [5] and [6].
On panel 5-213, check diode M411 [7].

NOT OK

Replace diode [7].

Chart 104

```
**************************************-------------------------------
* THE AUDIBLE INDICATOR DOES NOT     *| GROUND EQUIPMENT REQUIRED   |
* SOUND.                             *|-----------------------------|
**************************************| DESCRIPTION        PART NO. |
                                      |-----------------------------|
                                      | MULTIMETER                  |
                                      -------------------------------

*****************************************************
* On Steward's panel 2-221, press FLIGHT DECK CALL  *
* indicator light/switch :                          *
* - on panel 4-211, STEWARD CALL light illuminates  *
* - the audible indicator sounds.                   *
*****************************************************
   |     |
   |     |       ----------------------------------------------------
  YES    NO-------| Replace audible indicator [4].                  |
   |             ----------------------------------------------------
   |
*****************************************************
* Trip circuit breakers [5] and [6].                *
* On panel 5-213, check diode M480 [8].             *
*****************************************************
         |
         |       ----------------------------------------------------
         NOT OK---| Replace diode [8].                              |
                 ----------------------------------------------------
```

Chart 105

ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	MANUAL REF. WIRING DIAGRAM
[1] GRND CALL indicator light/switch		4-211	M77	Flight compart-ment	33-00-00 R/I	23-42-01 23-42-11
[2] Interphone box	715	715	R75	Nose gear leg	23-41-43 R/I	23-42-01 23-42-11
[3] Ground call horn	714	128 FR 27	M478	Nose geer bay	23-42-10 R/I	23-42-01 23-42-11
**ON A/C 001-005,						
[4] Audible indicator		5-213	M479	Flight compart-ment		23-42-01 23-42-11
**ON A/C 006-007,						
[4] Audible Indicator		5-213	M412	Flight compart-ment		
[5] Circuit breaker, 28VDC		16-215	H1216	Map Ref. none	24-50-00	23-42-01 23-42-11
[6] Circuit breaker, 28VDC		15-216	M78	Map Ref. A22	24-50-00 R/I	33-27-01 33-27-11
[7] Diode		5-213	M411	Flight compart-ment		23-42-11
[8] Diode		5-213	M480	Flight compart-ment		23-42-11

Component Identification
Table 101

GROUND CALL - ADJUSTMENT/TEST

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	

B. Prepare

(1) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing)

(2) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUND CALL	16-215	H1216	
PASS CALL SUP	15-216	M 78	A22

(3) Operate electronics rack ventilation (Ref. 21-21-00).

C. Tests

(1) On panel 4-211, press GRND CALL indicator light/switch and make certain that :
- the call light illuminates on interphone box located on nose gear leg
- the ground call horn located inside nose gear bay sounds.

(2) On panel 4-211, release GRND CALL indicator light/switch and make certain that :
- the call light on interphone box is off
- the ground call horn no longer sounds.

(3) On interphone box located on nose gear leg, press call switch and make certain that :

(a) On panel 4-211
- GRND CALL indicator light/switch is illuminated.

- STEWARD CALL indicator light/switch is extinguished.

(b) On panel 5-213, the audible indicator sounds.

(4) On interphone box, release call switch and make certain that :

(a) On panel 4-211
- STEWARD CALL indicator light/switch remains extinguished
- GRND CALL indicator light/switch extinguishes.

(b) On panel 5-213, the audible indicator no longer sounds.

D. Close-Up

(1) Stop electronics rack ventilation (Ref. 21-21-00).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

Refer to operational test in paragraph 1.

3. System Test

Refer to operational test in paragraph 1.

GROUND CALL HORN M478 - REMOVAL/INSTALLATION

1. General

The ground call horn M478 is located in zone 128 in nose gear bay.

2. Ground Call Horn M478

A. Equipment and Materials

DESCRIPTION	PART NO.
- Access Platform, 11 ft. 4 in. (3.47 m)	
- Circuit Breaker Safety Clips	
- Electrical Ground Power Unit	

B. Prepare

(1) Open nose gear door (Ref. 32-00-00, Servicing).

(2) Install access platform.

(3) Trip, safety and tag the following circuit breakers :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
GROUND CALL	16-215	H1216	None
PASS CALL SUP	15-216	M 78	A22

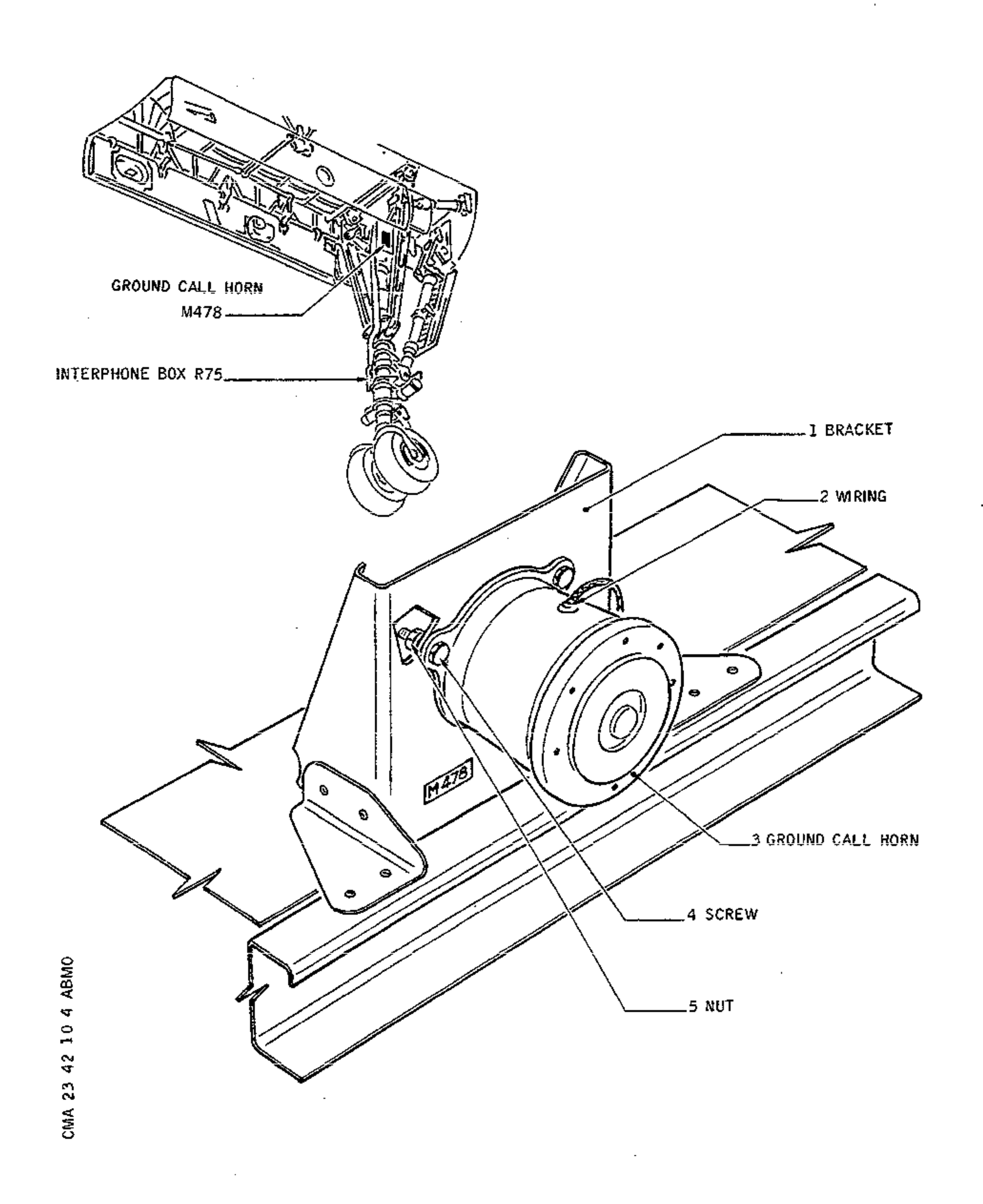
R

C. Removal (Ref. Fig. 401)

(1) In zone 128, FR27, in nose gear bay, unlock and unscrew the three screws (4) and nuts (5) attaching ground call horn (3) to bracket (1).

(2) Collect the three screws and nuts while holding ground call horn.

(3) On ground call horn, remove nuts and washers attaching



Ground Call Horn M478
Figure 401

electrical wiring (2).

D. Preparation of Replacement Component

(1) Make certain that replacement horn does not show evidence of impact damage, deteriorated insulation or broken terminal.

E. Install
(Ref. Fig.401)

(1) Connect electrical wiring (2) to ground call horn (3) as follows:
- wire M113E to terminal 1
- wire M114D-N to terminal 2

(2) Install washers and nuts on electrical connections.

(3) Position ground call horn (3) on bracket (1). Install one screw (4) and associated nut (5), then tighten a few turns.

(4) Install the other two screws (4) and associated nuts (5). Tighten the three screws.

F. Test
R (Ref. Fig.402 and 402A)

(1) Remove safety clips and tags and reset circuit breakers previously tripped in para.2.B (3).

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

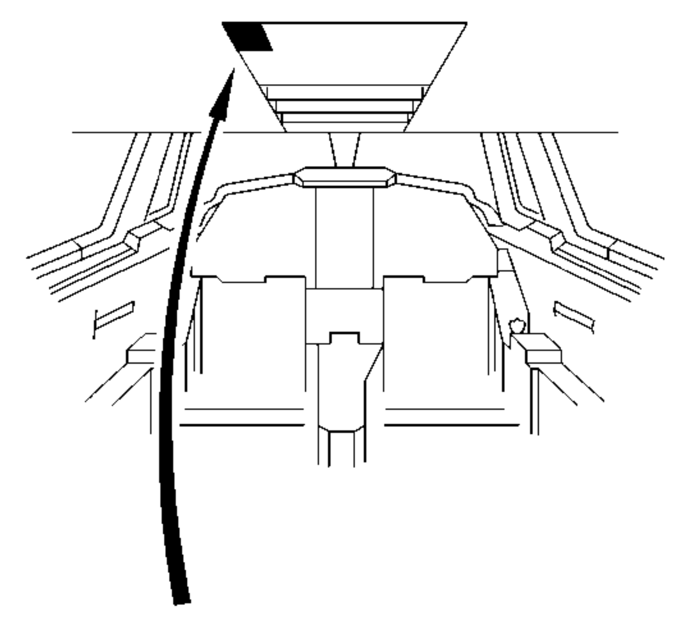
(3) Operate electronics racks ventilation (Ref. 21-21-00).

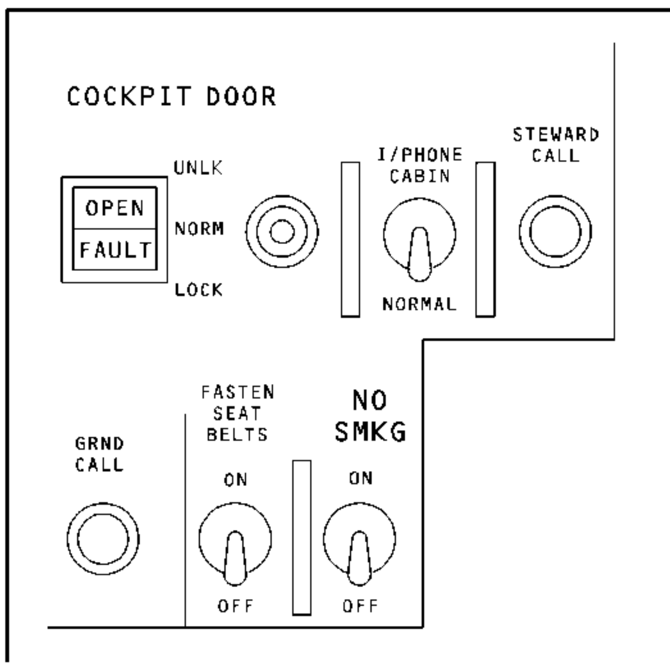
(4) In flight compartment, on overhead panel 4-2111, press GRND CALL indicator light/switch and check that:

(a) The ground call horn sounds in nose gear bay in zone 128.

(b) The ground call light illuminates on interphone box R75 in zone 715.

(5) On overhead panel 4-211, release GRND CALL indicator light/switch
- the ground call horn stops sounding
- the ground call light on interphone box extinguishes.

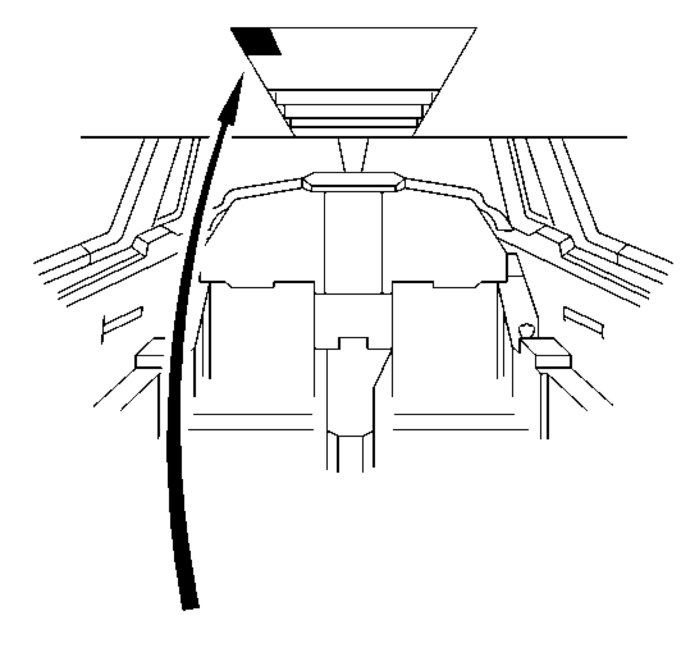


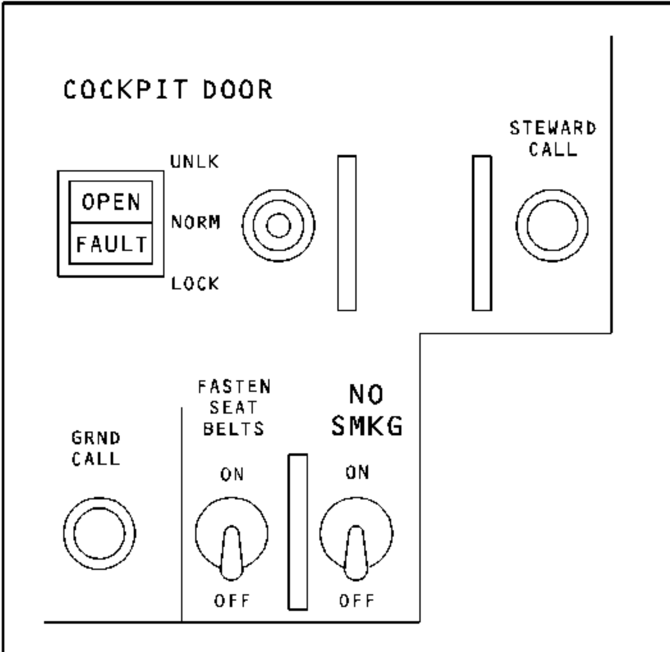


CMB 23 42 10 4 ACMA 00 BA

R

Ground Call Horn Controls
Figure 402





CMB 23 42 10 4 ACMM 00 BA

R

Ground Call Horn Controls
Figure 402A

G. Close-Up

(1) Remove access platform.

(2) Close nose gear doors if required (Ref. 32-00-00, Servicing).

(3) Stop electronics racks ventilation (Ref. 21-21-00).

(4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(5) Close access door 128AB if required.

RADIO COMMUNICATION - DESCRIPTION AND OPERATION

1. General

The part of the system controlling the inputs and outputs of communication and navigation transceivers is dealt with in chapter 23-41-00 (Interphone).

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STATIC DISCHARGING - DESCRIPTION AND OPERATION

1. General

Static dischargers are small dummy antennas which allow dispersion of the electrostatic charges accumulated by the aircraft in flight.

2. System Components

A. Static Dischargers (Ref. Fig. 001)

(1) Twenty six static dischargers are installed on the aircraft and are located as follows:

- 6 static dischargers on LH outer elevon (zone 596)
- 2 static dischargers on LH outer elevon (zone 595)
- 6 static dischargers on RH outer elevon (zone 696)
- 2 static dischargers on RH outer elevon (zone 695)
- 8 static dischargers on upper rudder (zone 332)
- 1 static discharger on tail cone (zone 313)
- 1 static discharger on tail cone (zone 314)

3. Description

A. Static Dischargers (Ref. Fig. 001)

Static dischargers consist of a flexible metal rod protected by two shrink plastic sleeves. The rod has a carbon prod at one end and a threaded hexagonal tip at the other end. The static dischargers are attached to the elevons, the upper rudder and the tail cone.

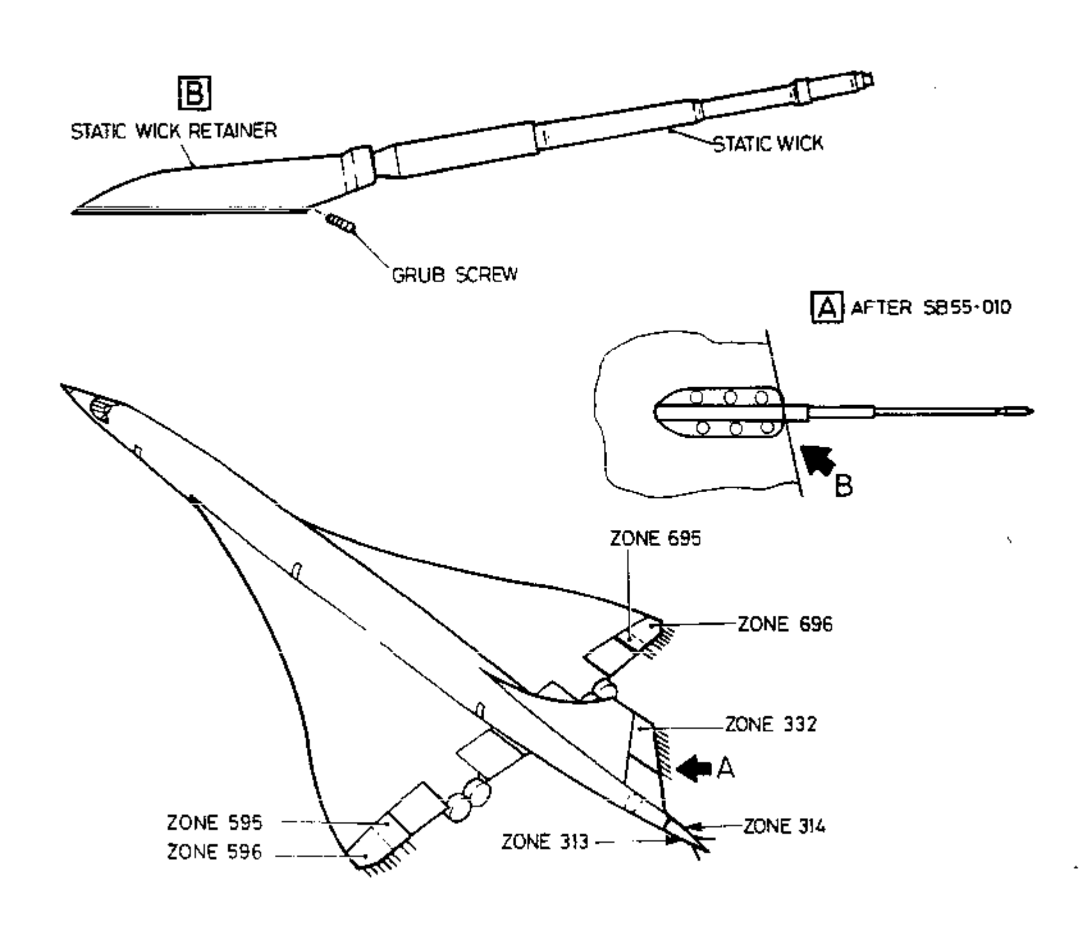
R * * AFTER SB 55-010 For A/C ALL

R The static dischargers on the upper rudder have a static
R wick retainer in place of the threaded hexagonal tip. The
R static wick retainers hold the static wicks with a grub
R screw and attach to the upper rudder with rivets. The
R static wicks at stations ZA183.13, ZA232.63, ZA252.13 and
R ZA264.45 attach to the left side of the upper rudder;
R the static wicks at stations ZA140.36, ZA212.88,
R ZA244.38 and ZA259.13 attach to the right side of the upper
R rudder.

4. Operation

A. Static Dischargers

Electrostatic charges accumulated in flight are collected by the static discharger carbon prods which provide for their dispersion outside the aircraft, in order to avoid the building up of excessive static voltages on the aircraft, which could interfere with radio communication and systems.



STATIC DISCHARGER

THREADED END HEXAGONAL TIP SHRINK-SLEEVE CARBON PROD

CMA 23 60 00 0 AAMO 01

Static Dischargers : Location and Attachment
Figure 001

STATIC DISCHARGERS - REMOVAL/INSTALLATION

1. General

Static dischargers are installed on elevons, tail cone and upper rudder.
The purpose of this removal/installation is to replace static dischargers which have been lost or damaged.

2. Removal/Installation of Static Dischargers

A. Equipment and Materials

(1) For static dischargers installed on elevons

DESCRIPTION	PART NO.
Access Platform, 12 ft. 6 in (3.57 m)	-
Special Materials (Ref. 20-30-00)	Product No.146
Circuit Breaker Safety Clips	-
Milliohmmeter	-

(2) For static dischargers installed on tail cone

DESCRIPTION	PART NO.
Access Platform, 13 ft. 7 in (4.06 m)	-
Special Materials (Ref. 20-30-00)	Product No.146
Circuit Breaker Safety Clips	-
Milliohmmeter	-

(3) For static dischargers installed on upper rudder

DESCRIPTION	PART NO.
Access Platform, 36 ft. 11 in (11.25 m)	-
Special Materials (Ref. 20-30-00)	Product No.146

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	-
Milliohmmeter	-

B. Prepare

WARNING: DISPLAY WARNING NOTICES ON ENGINES 1, 2 AND 3 PROHIBITING PRESSURIZATION OF BLUE, GREEN AND YELLOW HYDRAULIC SYSTEMS BY GROUND POWER UNIT. DISPLAY A WARNING NOTICE AT FLIGHT ENGINEER'S STATION PROHIBITING USE OF GROUND PRESSURIZING SYSTEM ELECTRIC PUMPS.

IF A HYDRAULIC GROUND POWER UNIT IS CONNECTED, DISPLAY A WARNING NOTICE ON THE GROUND POWER UNIT PROHIBITING PRESSURIZATION OF AIRCRAFT HYDRAULIC SYSTEMS.

(1) Trip, safety and tag the following circuit breaker:

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
HYD GRND CHECK OUT SEL VALVE CONT.	15-216	M626	F22

(2) Position access platform corresponding to static discharger(s) to be replaced.

C. Remove

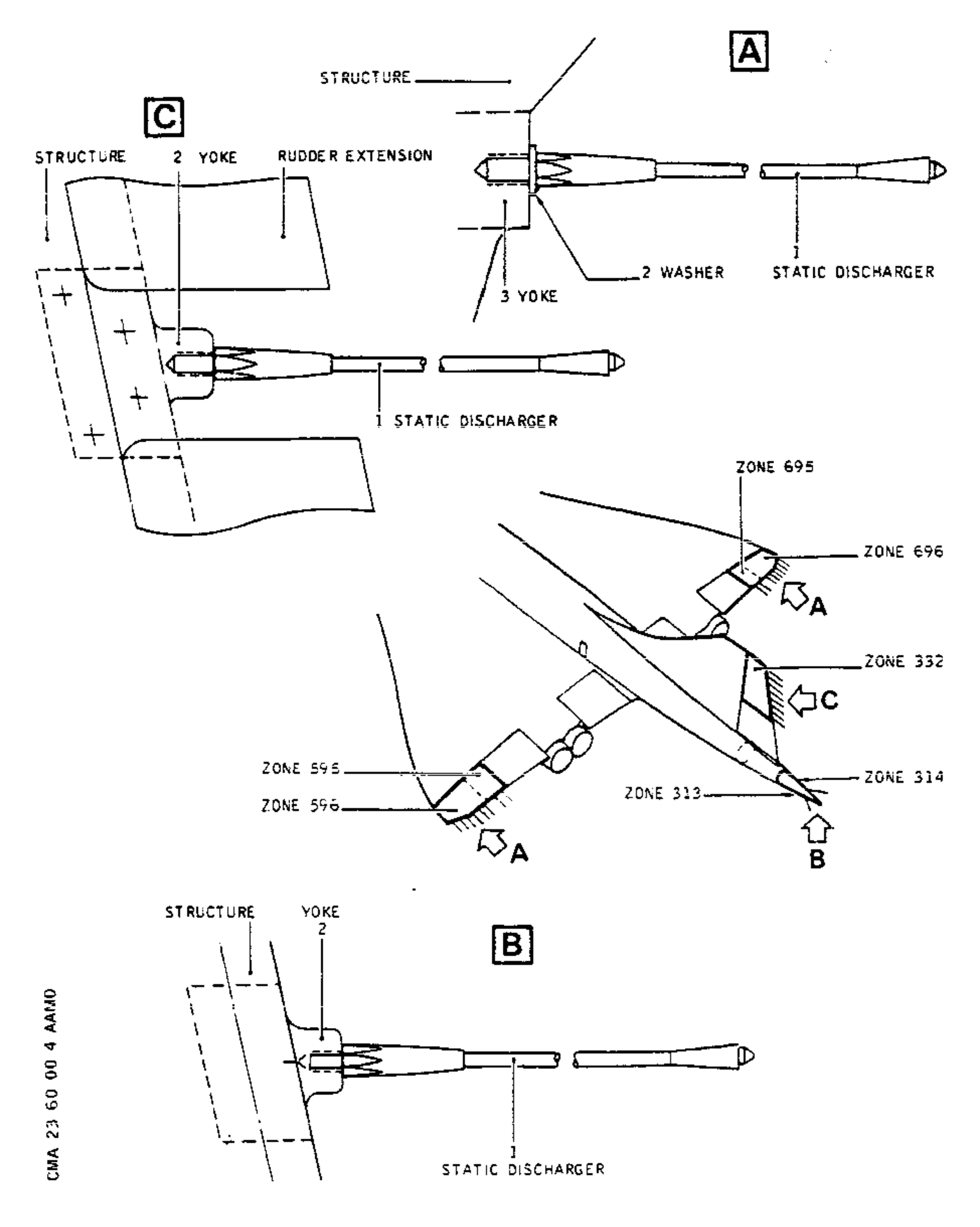
* * ON A/C 003-003, 005-005, (Ref. Fig. 401)

(1) Static Dischargers installed on elevons (zones 596, 595, 695, 696).

(a) Unlock, loosen then free static discharger(s) (1) and retain washer(s) (2).

(b) Clean yoke (3) threaded hole(s) of static discharger(s) to remove possible traces of locking product.

(2) Static dischargers installed on upper rudder (zone 352) and tail cone (zone 313, 314).



R

Location and Attachment of Static Dischargers
(Before SB 55-010)
Figure 401

(a) Unlock, loosen then free static discharger(s) (1).

(b) Clean yoke (2) threaded hole(s) of static discharger(s) to remove possible traces of locking product.

* * ON A/C 001-002, 004-004, 006-007, (Ref. Fig. 402)

(1) Static dischargers installed on elevons (zones 596, 595, 696, 695).

(a) Unlock, loosen then free static discharger(s) (1) and retain washer(s) (2).

(b) Clean yoke (3) threaded hole(s) of static discharger(s) to remove possible traces of locking product.

(2) Static dischargers installed on tail cone (zones 313, 314).

(a) Unlock, loosen then free static discharger(s) (1).

(b) Clean yoke (2) threaded hole(s) of static discharger(s) to remove possible traces of locking product.

R * * BEFORE SB 55-010

(3) Static dischargers installed on upper rudder (zone 352)

(a) Unlock, loosen then free static discharger(s) (1) from infill block special bolt (2).

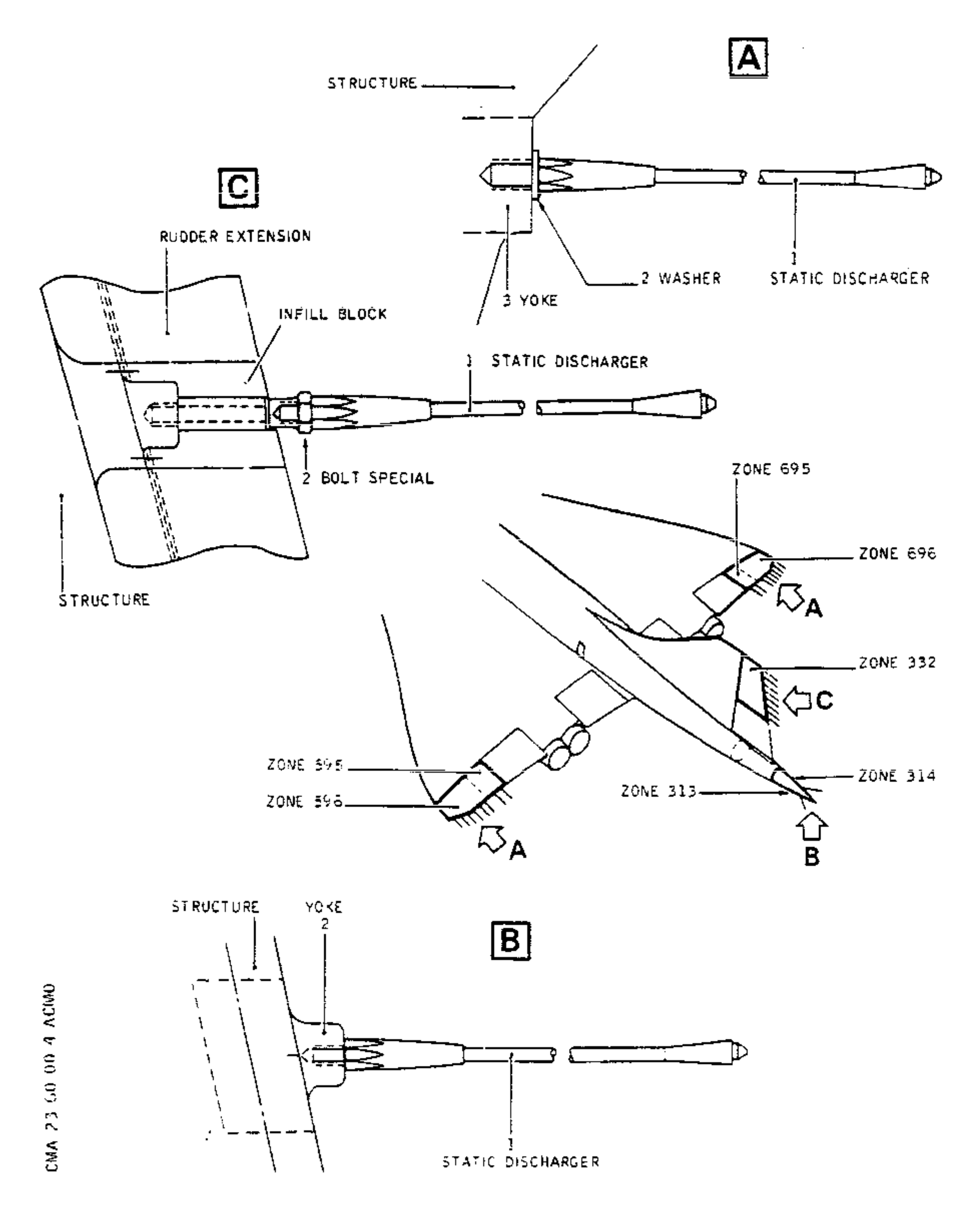
(b) Clean threaded hole of infill block special bolt to remove possible traces of locking product.

R * * AFTER SB 55-010 (Ref. Fig. 403)

R (3) Static dischargers installed on upper rudder
R (zone 352)

R (a) Loosen the grub screw (3) on the static wick
R retainer (1) which holds the static wick (2).

R (b) Pull the static wick (2) from the static wick
R retainer (1).



R Location and Attachment of Static Dischargers
(Before SB 55-010)
Figure 402

Location and Attachment of Static Dischargers
(After SB 55-010)
Figure 403

D. Preparation of Replacement Component

(1) Make certain that replacement component is in correct condition and especially that:

(a) metal rod does not show evidence of distortion

(b) plastic shrink sleeve is not damaged

(c) carbon prod crimped at one end is in correct condition

(d) attachment threading is in correct condition.

E. Install

* * ON A/C 003-003, 005-005, (Ref. Fig. 401)

(1) Static dischargers installed on elevons (zones 595, 596, 695, 696).

(a) Coat the inside of yoke (3) threaded hole with Product No.146 (Ref. 20-30-00).

(b) Position static discharger (1) with washer (2) then torque to between 28 and 32 lbf in (0.32 and 0.36 mdaN).

(2) Static dischargers installed on tail cone (zones 313, 314) and upper rudder (zone 352).

(a) Coat the inside of yoke (2) threaded hole with Product No.146 (Ref. 20-30-00).

(b) Position static discharger (1) and torque to between 28 and 32 lbf in (0.32 and 0.36 mdaN).

* * ON A/C 001-002, 004-004, 006-007, (Ref. Fig. 402)

(1) Static dischargers installed on elevons (zones 595, 596, 695, 696).

(a) Coat the inside of yoke (3) threaded hole with Product No.146 (Ref. 20-30-00).

(b) Position static discharger (1) with washer (2) then torque to between 28 and 32 lbf in (0.32 and 0.36 mdaN).

(2) Static dischargers installed on tail cone (zones 313, 314).

(a) Coat the inside of yoke (2) threaded hole with Product No.146 (Ref. 20-30-00).

(b) Position static discharger (1) and torque to between 28 and 32 lbf in (0.32 and 0.36 mdaN).

R * * BEFORE SB 55-010

(3) Static dischargers installed on upper rudder (zone 352).

(a) Coat the inside of the infill block special bolt (2) threaded hole with Product No.146 (Ref. 20-30-00).

(b) Position static discharger (1) and torque to between 28 and 32 lbf in (0.32 and 0.36 mdaN).

R * * AFTER SB 55-010 (Ref. Fig. 403)

R (3) Static dischargers installed on upper rudder (zone
R 352).

R (a) Push the static wick (2) into the static wick
R retainer (1), and align the slot in the wick with
R the hole in the static wick retainer.

R (b) Tighten the grub screw (3) on the static wick
R retainer (1) to secure the static wick (2).

F. Check

(1) Using the milliohmmeter, measure resistance between static discharger base and yoke
- resistance should not exceed 1 ohm.

G. Close-up

(1) Make certain that working area is clean and clear of tools and miscellaneous items of equipment.

(2) Remove access platform.

(3) Remove safety clip and tag and reset circuit breaker mentioned in paragraph 2.B.(1).

(4) Remove warning notices

(a) on engines 1, 2 and 3

(b) at Flight Engineer's station

(c) on hydraulic ground power unit as applicable.

COCKPIT VOICE RECORDER - DESCRIPTION AND OPERATION

1. General

The cockpit voice recorder system consists of an airborne endless-loop magnetic tape recorder.
This system is designed to record crew conversations and communications in flight and to preserve such records in the event of accidents.
When operating, the system permanently and simultaneously records information on a 4-track endless-loop magnetic tape with a total recording time of half-an-hour.
The recorder automatically erases as it records, so that only the last half hour of the record is retained.
A monitoring device installed in the flight compartment allows all four channels to be checked for correct operation.
The recorded conversations and communications can be completely and instantly erased when the aircraft is parked, thus avoiding unauthorized access to the record.
Reproduction of the record is possible only when the recorder is removed from aircraft.

2. System Components

The voice recorder system includes the following components :

- A voice recorder (R 186) with a magnetic tape.
- A control unit (R 187).
- An area microphone (R 189).

3. Area Microphone-FAIRCHILD A55/3

A. Description and Operation

As soon as the recorder is energized, the area microphone, installed in the flight compartment on panel 4-211, ensures permanent voice recording in one track of the magnetic tape.
This microphone applies voices and aural warning to the pre-amplifier in control unit. The control unit feeds the signal amplified to the desired level to the amplifier on the relevant channel in the recorder.

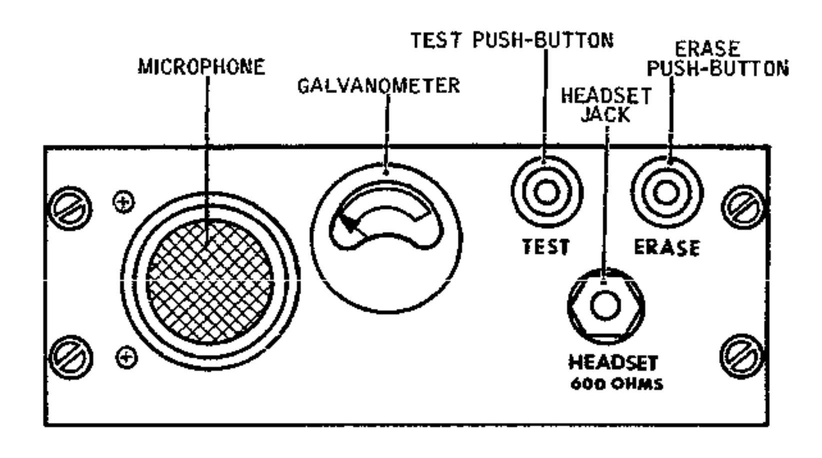
4. Control Unit-FAIRCHILD A152

A. General

The control unit is installed on Flight Engineer's panel 8-214.
By means of an external area microphone, the control unit

records all voice signals in the flight compartment while the monitoring circuit monitors system operation.

B. Description (Ref. Fig. 001)



CMA 23 71 00 0 BAMO

Control Unit - Front Face View
Figure 001

(1) The control unit is housed in a rectangular case of ATR panel size and of 1.2 lb (0.545 kg) maximum weight. On the front face are the following components :

- 1 microphone
- 1 ERASE push-button
- 1 TEST push-button
- 1 galvanometer
- 1 jack

On the rear face is an electrical connector for connection to aircraft electrical network.

(2) Main characteristics

Pass band	1000 - 5000 Hz

Output level	500 millivolts
Audio input impedance	20 Kohms
Automatic gain control (AGC)	Fast reacting 30 db range.

C. Operation

(1) Microphone and pre-amplifier

While the voice recorder is operating, the external area microphone is energized, thus transmitting a signal to a high gain, low noise amplifier through a filter. The amplifier output is applied to channel 4 of the voice recorder.
Gain variations are possible through one filter selected in 6 db steps from - 18 to + 20 db.
The automatic gain control is designed with a 30 db range which holds the audio output level below distortion limits under extreme conditions.

(2) ERASE push-button

This push-button, when pressed, provides complete erasure of the tape. Erasure can be achieved only with aircraft on the ground.

(3) TEST push-button

When pressed, the push-button provides a remote check of the voice recorder for correct operation and acts simultaneously on the four tracks of the tape.

(4) Galvanometer

The galvanometer is connected in series with that on the voice recorder.

(5) Jack

This jack is connected in parallel with that on the voice recorder.

(6) Integral microphone

The integral microphone is not used as it is replaced by the external area microphone.

5. Recorder Assembly

A. General

The recorder assembly is housed in the recorder unit. When interrogation of the recording magnetic tape is required, commercial reproducers will permit read out of voices on two of the four channels in a workshop. Special equipment is required to read out the four channels. The recorder assembly includes the following components :

- A drive unit assembly and a motor.
- A reel cover assembly.
- A reel and tape assembly.
- Insulation assemblies.

B. Description

(1) Main characteristics

Tape	Magnetic, 0.250 inch (6.35 mm) wide
Tape length	308 feet (93.8 m)
Tape speed	1 7/8 in./s (47.6 mm/s)
Recording duration	30 mn
Recorder bias	65 KHz

(2) Assemblies

(a) Drive unit assembly

The drive unit assembly consists of a bridge containing the recording, monitor and erase heads. A capstan assembly controls tape speed and a chute subassembly introduces tape back into the reel.

(b) Reel cover assembly

The reel cover assembly consists of the bulk erase coil, five tape guide rollers and a reel cover.

(c) Reel and tape assembly

The endless-loop magnetic tape is oxyde on one side and graphite-lubricated on the other side. The tape is wound on the reel.

(d) Insulation assembly

The insulation assembly is a special thermal insulating package sealed with a resilient material.
The insulation assembly fully encloses the drive

unit assembly of the recorder and protects it from shocks and thermal damage.

C. Operation

(1) Drive unit assembly

When the recorder is powered through aircraft network, the motor drives a belt and the capstan and causes the tape to move at a determined speed.
The tape is endless and it first moves past the erase head which eliminates the previous voice signals recorded on the tape by means of a 65 KHz nominal frequency AC signal.
The tape continues to rotate, moves past the recording head for impressions on one or the four tracks of the magnetic tape, then the tape moves past the monitor head which reads the output signals impressed by the recording head. The monitor head uses the signals impressed by the recording head as test signals.

(2) Insulation assembly

The insulation package is an inert mineral fibrous mass that surrounds the inner recorder assembly. This material is covered with a plastic material which improves the insulation quality by acting as a waterproof barrier. The insulating components are partially saturated with a predetermined amount of water. When exposed to extreme heat, the plastic covering decomposes, thus eliminating a certain amount of water from the saturated insulating medium. Low temperature allows the steam generated in the reel case to vent to the atmosphere. The generation of steam results in an isothermal barrier between the high temperature of the outer area and the enclosed tape module.

6. <u>Voice Recorder-FAIRCHILD A100</u>

A. General

The voice recorder is located in rear RH side console (zone 244), on shelf 7-244 (FR72). It is secured to a shockmount by means of two locking screws engaging two holding tabs located at the lower part of the recorder front face. This type of attachment enables quick removal or installation.
The voice recorder mainly consists of two parts :

- The recorder assembly described in paragraph 5.
- The electronic chassis.

B. Description (Ref. Fig. 002)

(1) Mechanical characteristics

The recorder unit is housed in an international orange, one-half ATR short, rectangular equipment case that weighs 21.4 lb. (9.7 kg).
On the front face are located the following components:

- A MONITOR jack to connect a 600 ohms headset
- A galvanometer
- 5 push-to-test buttons, four numbered from 1 to 4 and one identified "ALL".
- A carrying handle

On the rear face is an electrical connector for connection to aircraft electrical network.

(2) Main physical characteristics

(a) Operating environment

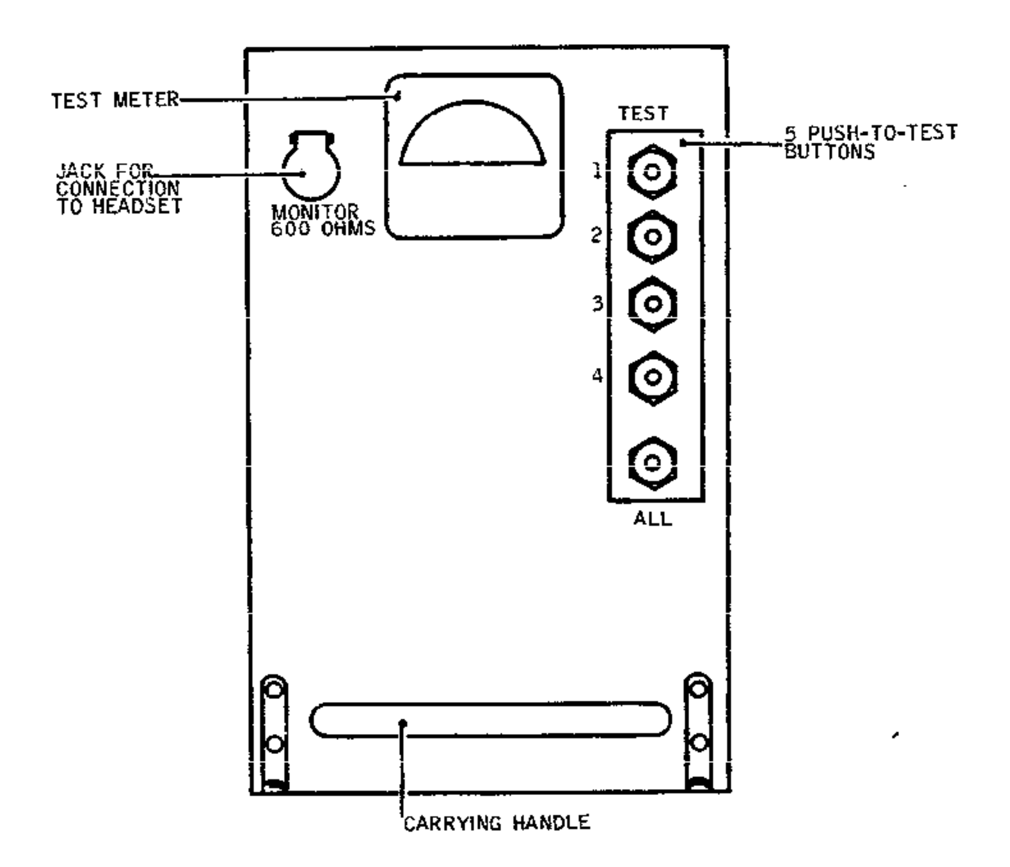
Altitude	From - 1000 to + 50 000 ft
Maximum temperature	+ 55°C
Minimum temperature	- 54°C
Vibrations	10 - 500 Hz, 5 G
Shocks (crash safety)	15 G
Positioning	No special requirement
Humidity	Up to 100 %

(b) Accident environment

Impact shock	100 G, 11 milliseconds
Fire	1100°C, 30 mn
Salt water immersion	Unaffected

(3) Main electrical characteristics

Channel input isolation	By balanced or unbalanced isolation transformers
Channel input level	Greater than or equal to 100 millivolts
Channel input impedance	7000 ohms
Bulk erase	Electrical interlock
Audio frequency response	300 - 5000 Hz
Signal-to-noise ratio	45 dB minimum
Harmonic distortion	Maximum 5 %
Flutter	1.5 % max. of modulated signal
Radio frequency susceptibility	Unaffected



CMA 23 71 00 0 BCM0

Voice Recorder - Front Face View
Figure 002

Audio frequency magnetic field susceptibility — Unaffected

(4) Electronic chassis

The electronic chassis consists of the following modules :

- Channel amplifiers
- A bias generator
- A monitor amplifier
- A test module
- A bulk erase module
- A power supply module

(a) Channel amplifiers

Four identical and interchangeable amplifiers receive both the audio signal or test signal and the record bias signal in order to feed an AC signal to the recording heads.

(b) Bias generator

The bias generator :

- Feeds a 65 KHz, AC record bias signal to the channel amplifiers.
- Feeds a continuous erase signal to the erase head.

(c) Monitor amplifier

This module amplifies the tape-recorded monitor signals for simultaneous playback of all four recorded tracks.

The signals on the tracks are reproduced at MONITOR jack output to be checked. Moreover, the module output is simultaneously used to control galvanometers circuit which displays GO or NO GO condition.

(d) Test module

The test module generates a test signal after pressing push-to-test button for one or for all channels.
A 600 Hz test signal is transmitted and recorded on the tape, then it is picked up by the monitor head and applied to the monitor amplifier which

displays a GO or a NO GO condition on the galvanometer circuit.

(e) Bulk erase module

The bulk erase module erases the entire tape by pressing the ERASE push-button (on control unit). The bulk erase module begins to erase the tape as soon as the push-button is released. An interlock circuit avoids any accidental erasures.

(f) Power supply module

The power supply module provides the voltages required for recorder unit operation.

C. Operation

(Ref. Fig. 003)

(1) Recording circuit

The recording circuit consists of four identical record channels. These channels are independent from each other and their inputs are separated by isolation transformers.

(a) Inputs

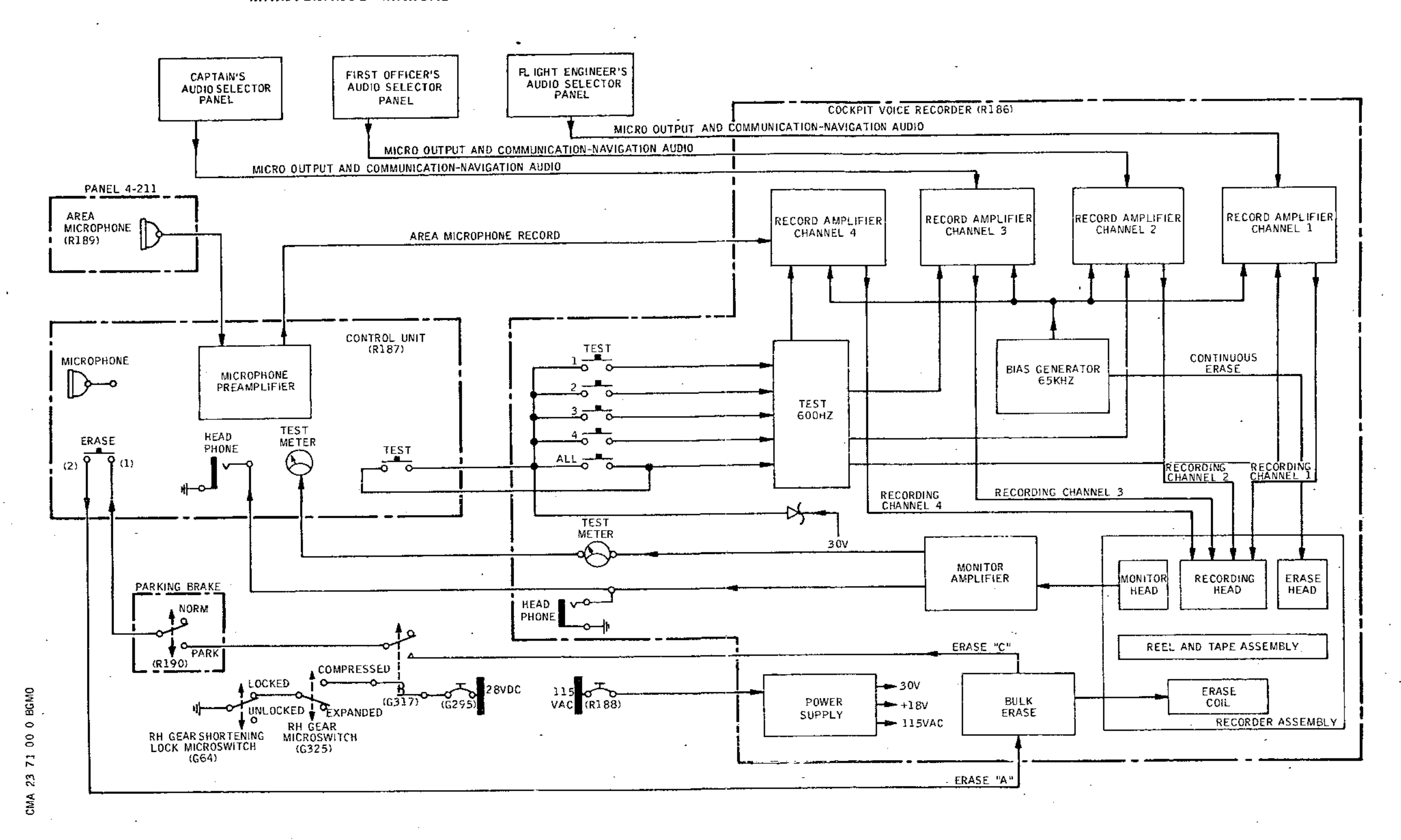
Channel 1 records microphone and reception communication/navigation outputs from Flight Engineer's audio selector panel.
Channel 2 records microphone and reception communication/navigation outputs from First Officer's audio selector panel.
Channel 3 records microphone and reception communication/navigation outputs from Captain's audio selector panel.
Channel 4 enables recording from the area microphone (R189) located on panel 4-211 in flight compartment.

(b) Recording of one channel

As the four channels have an identical design inside the recorder unit, each channel operation is similar. Only channel 4, activated by audio signals from area microphone shall be described here. The audio frequency signal from the area microphone (R 189) is amplified by the pre-amplifier in control unit (R 187) ; it is then

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Cockpit Voice Recorder - System Operation
Figure 003

applied to voice recorder (R 186) through channel 4 amplifier input by means of an isolation transformer.
The amplifier also receives a 65 KHz frequency signal from the bias generator. After the mixing and amplifying sequence, the resulting AC signal is directly fed to the recording head.
The recording head is a four-position head with parallel pole pieces to provide four-track simultaneous recording.
The activated pole piece allows magnetic impression on the corresponding track of the tape.

(2) Monitoring circuit

The monitoring circuit operates from signals picked up by the monitor head.
The function of the monitor amplifier is to convert and amplify the signals recorded by the recording head and present them at a test jack for continuous and simultaneous playback of all four recorded tracks.
The jack output is 10 mW for a 600 ohm load.
The primary function of the monitor amplifier is to process the test signal. A 600 Hz sine wave signal is generated by the test circuit and is impressed on the tape.
The monitor head detects the signal. The resulting signal is directed to the monitor amplifier where it is transmitted through a 600 Hz tuned circuit to galvanometers located on recorder (R 186) and on control unit (R 187).
The galvanometers give a GO or a NO GO indication.
The meter pointer indicates a nominal value of 8 Volts at least for a GO condition.
Because of the nature of the circuit, an input signal less than 250 millivolts at the monitor amplifier will not turn on the control transistor, and a NO GO indication will be present at the galvanometers.
Only the signal from the test circuit will deflect the galvanometer pointers.

(3) Test circuit

The test circuit is used to check the equipment for correct condition.
When either TEST push-button on control unit (R 187) or TEST ALL push-button on recorder (R 186) is pressed, a 600 Hz sine wave signal is fed to a ring counter and a gate, the ring counter elaborates a time sequence for each recording channel, beginning with channel 1 and recommencing with channel 4.

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Each amplifier receives the test signal for approximately 0.8 second in sequence ; the signal is amplified in the same way as a recording signal, and is transmitted to the head where it is electromagnetically impressed on the tape.
The monitor amplifier converts the test sequence and supplies the indicating circuit which displays a GO or NO GO condition.
Because of the short time interval between each channel being fed with the test signal, the galvanometer pointers rise to an indication but do not completely fall to zero, thus causing an oscillating effect. If one channel is faulty, the galvanometer pointer will give a NO GO indication.
Independently of simultaneous testing of all channels, it is possible to test each channel by pressing the relevant TEST push-button located on the front face of the recorder. Channel 1 is tested by manually pressing push-button 1 etc...
Pressing one of those push-buttons activates the ring counter to test the selected channel.
The test function does not interrupt voice recording on any of the channels. The 600 Hz signal is received in the headset connected to the jack located on the recorder or on the control unit while a deflection of the galvanometer pointers can be seen.

(4) Bulk erase

(a) Automatic bulk erase

A signal from the bias generator is permanently fed to the erase head. This head being located upstream of the record head, erasing is performed before new signals are impressed on the magnetic tape, thus avoiding superimposition of the information.
The automatic bulk erase function can be achieved in flight or on the ground.

(b) Manual bulk erase

NOTE : Manual erasing is possible only when the aircraft is on the ground (landing gears downlocked, shock-absorbers compressed) with parking brake control lever placed in PARK position.

With the aircraft on the ground, an erase signal (ERASE base C) from the BULK ERASE plate is applied to contact (1) of control unit (R 187)

ERASE push-button as follows :

(b1) RH main gear shortening lock microswitch (G 64) is in Locked position.

(b2) RH main gear microswitch (G 325) is in compressed position.
With circuit breaker (G 295) set, relay (G 317) is energized and the erase signal is applied to parking brake switch (R 190).
With parking brake control lever in PARK position, the erase signal is received on contact (1) of ERASE push-button. When the ERASE push-button on control unit is pressed for two seconds, the erase signal is applied through contact (2) to a delay circuit, at ERASE A input of the bulk erase module.

The bulk erase module controls the electromagnetic coil located in the reel cover assembly.
The delay circuit applies a 115 Volts, 400 Hz signal to the erase coil/capacitor resonnant circuit for a period of approximately five seconds, time necessary for the tape to be erased.

COCKPIT VOICE RECORDER - TROUBLE SHOOTING

WARNING : OBSERVE SAFETY PRECAUTIONS DESCRIBED IN 23-00-00, SERVICING

1. General

The following trouble shooting procedures are intended to enable faults found in the cockpit voice recorder system to be quickly rectified. The defects can be isolated with the aid of trouble shooting procedures (Ref. Para. 3) and traced through OK and NOT OK paths to the appropriate charts or other specified rectification action as may be required. If a defect occurs, perform the appropriate rectification action, then repeat the operation at which the defect was encountered to ensure that the operation is OK.
Bracketed numbers in the procedures and charts indicate items on the component identification table (Ref. Table 101), The table provides information including component location required for rectification.
All procedures dealing with trouble shooting are based on the assumption that electrical wiring is serviceable, all associated circuit breakers are set and electrical power is available unless otherwise stated. If the fault is not rectified, check the wiring in accordance with the Wiring Diagram Manual (Ref. Table 101).

2. Prepare

A. The aircraft is on the ground with landing gear downlocked and shock-absorbers compressed.

B. In zone 244, in RH rear electronics rack, remove access panel 244ES.

C. Make certain that all PTT switches are in intermediate position.

D. On Captain's, First Officer's and Flight Engineer's jack panels, connect a boomset to HEADSET and MIC jacks.

E. On audio selector panels, make certain that :

(1) All keys on keybeard are disengaged

(2) All reception push-buttons are disengaged

(3) BOOM-MASK switch is in BOOM position

(4) VOICE push-button is disengaged

F. Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No1 INPH SUP	1-213	R 89	K19
RH UC WEIGHT SW & DOWNNLOCK "A" SYS SUP		G 295	M18
VOICE REC SUP	2-213	R 188	G18
No2 INPH SUP	3-213	R 90	H 2

G. Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

H. Operate electronics rack ventilation (Ref. 21-21-00).

I. On Flight Engineer's panel 8-214, on cockpit voice recorder control unit, connect headset to HEADSET 600 OHMS jack.

3. <u>Trouble Shooting</u>

```
*****************************************************
* On cockpit voice recorder control unit [1], press *
* then release TEST push-button :                   *
* - galvanometer pointer indicates "8" at least per *
*   period of 0.8 second (1 pointer deflection      *
*   per track).                                     *
* - a 600Hz test signal is heard in headset during  *
*   5 seconds approx. (audio signal heard during 0.8*
*   second for each track).                  IF     *
*****************************************************
   ||    |
   ||    |         --------------------------------------------------
   OK   NOT OK----| No pointer deflection and no signal heard.       |
   ||    |        | Ref. Chart 101.                                  |
   ||    |         --------------------------------------------------
   ||    |
   ||    |         --------------------------------------------------
   OK   NOT OK----| No pointer deflection but 600Hz test signal      |
   ||             | heard. Ref. Chart 102.                           |
   ||              --------------------------------------------------
   ||
*****************************************************
* On area microphone, place a mask [5].             *
* (1) On Captain's jack panel [13], speak in boomset*
*     microphone and make certain that voice is     *
*     heard in headset connected to cockpit voice   *
*     recorder control unit [1].                    *
*                                                   *
* (2) On First Officer's jack panel [14], speak in  *
*     boomset microphone and make certain that voice*
*     is heard in headset connected cockpit voice   *
*     recorder control unit [1].                    *
*                                                   *
* (3) On Flight Engineer's jack panel [15], speak in*
*     boomset microphone and make certain that voice*
*     is heard in cockpit voice recorder control    *
*     unit [1].                              IF     *
*****************************************************
   ||       |      --------------------------------------------------
   ||       |     | No microphone recording on either Captain's      |
   ||       |     | (channel 3), First Officer's (channel 2), or     |
   OK      NOT OK-| Flight Engineer's (channel 1) channel.           |
   ||             | Ref. Chart 103.                                  |
   ||              --------------------------------------------------
```

```
***||***********************************************
* Remove mask from area microphone [5], then speak  *
* in microphone and make certain that voice is heard*
* in headset connected to cockpit voice recorder    *
* control unit [1].                          IF     *
*****************************************************
   ||        |      -----------------------------------------------------
   OK        NOT OK-| No recording on area microphone channel (chan- |
   ||               | nel 4). Ref. Chart 104.                        |
   ||               -----------------------------------------------------
****************************************************
* On Captain's [2], First Officer's [3], and Flight*
* Engineer's [4] audio selector panels :           *
* - place INT-R/T PTT switch in INT position.      *
* - engage INT reception push-button and place     *
*   integral potentiometer in intermediate position*
*   Speak in boomsets at Captain's, First Officer's*
*   and Flight Engineer's stations and each time   *
*   make certain that voice is heard in headset    *
*   connected to cockpit voice recorder control    *
*   unit [1].                                IF    *
****************************************************
   ||        |      -----------------------------------------------------
   ||        |      | No reception signal recorded on either           |
   OK        NOT OK-| Captain's (channel 3), First Officer's (channel|
   ||               | 2) or Flight Engineer's (channel 1) channel.   |
   ||               | Ref. Chart 105.                                |
   ||               -----------------------------------------------------
   ||
*****************************************************
* On lower centre console 9-211, place brake        *
* selector lever in PARK position.                  *
* On cockpit voice recorder control unit [1], press *
* ERASE push-button for about 0.5 second.           *
* - Check that a 400Hz erase signal is heard in     *
*   headset connected to control unit [1].  IF      *
*****************************************************
   ||    |
   ||    |          -----------------------------------------------------
   OK    NOT OK----| No erase signal. Ref. Chart 106.                 |
   ||               -----------------------------------------------------
   ||
```

```
   ||
   ||
*****************************************************
* On lower centre console 9-211, place brake       *
* selector lever in NORM position.                  *
* On cockpit voice recorder control unit [1], press *
* ERASE push-button :                               *
* - check that no 400Hz erase signal is heard in    *
*   headset connected to control unit [1].  IF      *
*****************************************************
   ||   |
   ||   |      ------------------------------------------------
   OK   NOT OK----| Check microswitch [6]. Ref. Chart 107.      |
   ||          ------------------------------------------------
   ||
*****************************************************
* On lower centre console 9-211, place brake       *
* selector lever in PARK position.                  *
* Trip circuit breaker [7], then on control unit [1]*
* press ERASE push-button :                         *
* - check that no erase signal is heard in headset  *
*   connected to control unit [1].         IF       *
*****************************************************
   ||   |
   ||   |      ------------------------------------------------
   OK   NOT OK----| Replace relay [8].                          |
   ||          ------------------------------------------------
   ||
*****************************************************
* Cockpit voice recorder system is serviceable.     *
*****************************************************
```

NO POINTER DEFLECTION AND NO SIGNAL HEARD.

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
HEADSET	
MULTIMETER	

1. On lower centre console 9-211, place brake selector lever in PARK position.
2. On cockpit voice recorder control unit [1] :
   - Connect headset to relevant jack
   - Press ERASE push-button and check that a 400Hz erase signal is heard in headset.

YES ---

In rear electronics rack, on shelf 6-244, on cockpit voice recorder [9] :
1. Connect headset to MONITOR jack
2. Press TEST-ALL push-button and check that :
   - galvanometer pointer reads at least "8" per period of 0.8 second approx. (1 pointer deflection per track).
   - a 600Hz test signal is heard in headset.

YES — Replace cockpit voice recorder control unit [1].

NO — Replace cockpit voice recorder [9].

NO ---

Check 115 VAC at output of circuit breaker [10].

YES — Replace cockpit voice recorder [9].

NO — Replace circuit breaker [10].

Chart 101

```
*************************************-------------------------------
* NO POINTER DEFLECTION BUT 600HZ    *| GROUND EQUIPMENT REQUIRED   |
* TEST SIGNAL HEARD.                 *|-----------------------------|
**************************************| DESCRIPTION        PART NO. |
                                      |-----------------------------|
                                      | HEADSET                     |
                                      -------------------------------

****************************************************
* In rear electronics rack, on shelf 6-244, on     *
* cockpit voice recorder [9] :                     *
* 1. Connect headset to MONITOR jack               *
* 2. Press TEST-ALL push-button and check that :   *
*    - galvanometer pointer indicates at least "8" *
*      per period of 0.8 second (1 pointer deflec- *
*      tion per track)                             *
*    - a 600Hz test signal is heard in headset.    *
****************************************************
          |                                |
          NO                              YES
          |                                |
---------------------------------- ----------------------------------
| Replace cockpit voice recorder | | Replace cockpit voice recorder|
| [9].                           | | control unit [1].             |
---------------------------------- ----------------------------------
```

Chart 102

```
*************************************-------------------------------
* NO MICROPHONE RECORDING ON ONE OF  *| GROUND EQUIPMENT REQUIRED  |
* THE CHANNELS (CAPTAIN'S CHANNEL 3, *|----------------------------|
* FIRST OFFICER'S CHANNEL 2, FLIGHT  *| DESCRIPTION       PART NO. |
* ENGINEER'S CHANNEL 1).             *|----------------------------|
**************************************| HEADSET                    |
                                      |----------------------------|
                                      | MULTIMETER                 |
                                      ------------------------------

*****************************************************
* On aft electronics rack, shelf 6-244, on cockpit  *
* voice recorder [9] :                              *
* (1) Connect headset to MONITOR jack.              *
* (2) Press TEST push-button of channel presumed to *
*     be faulty : 1 (Flight Engineer), 2 (First     *
*     Officer), 3 (Captain).                        *
* (3) Check that                                    *
*     - galvanometer pointer indicates at least "8" *
*     - a 600Hz signal is heard.                    *
*****************************************************
    |        |    ----------------------------------------------
   YES      NO---| Replace cockpit voice recorder [9]          |
    |             ----------------------------------------------
    |
*****************************************************
* Check 28VDC supply to audio selector panels by    *
* circuit breakers [11] and [12].                   *
*****************************************************
    |        |
    |        |    ----------------------------------------------
   YES      NO---| Check interphone system supply (Ref.23-41-00,|
    |            | trouble shooting.                            |
                  ----------------------------------------------
    |
****************************************************
* Replace, faulty jack panel. Captain's [13], First*
* Officer's [14], Flight Engineer's [15].          *
****************************************************
             |    ----------------------------------------------
             |   | Replace faulty audio selector panel. Captain |
            NO---| [2] First Officer [3], Flight Engineer [4].  |
                  ----------------------------------------------
                                |
                             NOT OK
                                |
                  ----------------------------------------------
                 | Replace boomset.                             |
                  ----------------------------------------------
```

Chart 103

NO RECORDING ON AREA MICROPHONE CHANNEL 4

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
HEADSET	

In rear electronics rack, on cockpit voice recorder [9]:
1. Connect a headset to MONITOR jack
2. Press TEST 4 push-button.
3. Check that:
   - galvanometer pointer reads at least "8"
   - 600Hz test signal is heard.

NO → Replace cockpit voice recorder [9].

YES → Replace cockpit voice recorder control unit [1].

NOT OK → Replace area microphone [5].

Chart 104

```
*************************************
* NO RECEPTION SIGNAL RECORDED ON    *
* CAPTAIN'S (CHANNEL 3), FIRST       *
* OFFICER'S (CHANNEL 2) OR FLIGHT    *
* ENGINEER'S (CHANNEL 1) CHANNEL.    *
*************************************

****************************************************
* Replace audio selector panel associated to faulty *
* channel.                                          *
* - Channel 1, Flight Engineer's audio selector     *
*   panel [4].                                      *
* - Channel 2, First Officer's audio selector panel *
*   [3].                                            *
* - Channel 3, Captain's audio selector panel [2].  *
****************************************************
                         |
                         |
                        NO
                         |
****************************************************
* Replace interphone amplifier [16].                *
****************************************************
```

Chart 105

```
*************************************-------------------------------
* NO ERASE SIGNAL.                  *| GROUND EQUIPMENT REQUIRED   |
*************************************|-----------------------------|
                                     | DESCRIPTION        PART NO. |
                                     |-----------------------------|
                                     | MULTIMETER                  |
                                     -------------------------------

*******************************************************
* On lower centre console 9-211, place the 4 throttle  *
* levers in full idle position.                        *
* At Flight Engineer's station, on CABIN PRESSURE CONTROL*
* panel, make certain that the discharge valve magnetic *
* indicators display OPEN.                             *
*******************************************************
                   |                         |
                   NO                        |
                   |                         |
*****************************************    |
* Open access door 123AB, in relay box 3-213,*
* connect multimeter to pins 13A and 13D of  *
* connector UT1838 and check that the voltage*
* read is 28VDC.                            *
*****************************************    |
      |               |                      |
     NO              YES                    YES
      |               |                      |
      |       ---------------------------    |
      |       | Replace relay [8].       |   |
      |       ---------------------------    |
      |                                      |
-----------------------------------------    |
| See landing Gear and Doors Indicating  |   |
| (Ref. 32-61-00, Trouble Shooting).     |   |
-----------------------------------------    |
                                             |
              ***********************************************
              * Trip circuit breaker [10].                  *
              * At Flight Engineer's panel, remove cockpit voice *
              * recorder control unit [1].                  *
              * Connect multimeter to pins H and G of control unit*
              * [1] and check that there is continuity when *
              * ERASE push-button is pressed.               *
              ***********************************************
                   |                         |
                   |                         |
```

Chart 106 (Sheet 1 of 2)

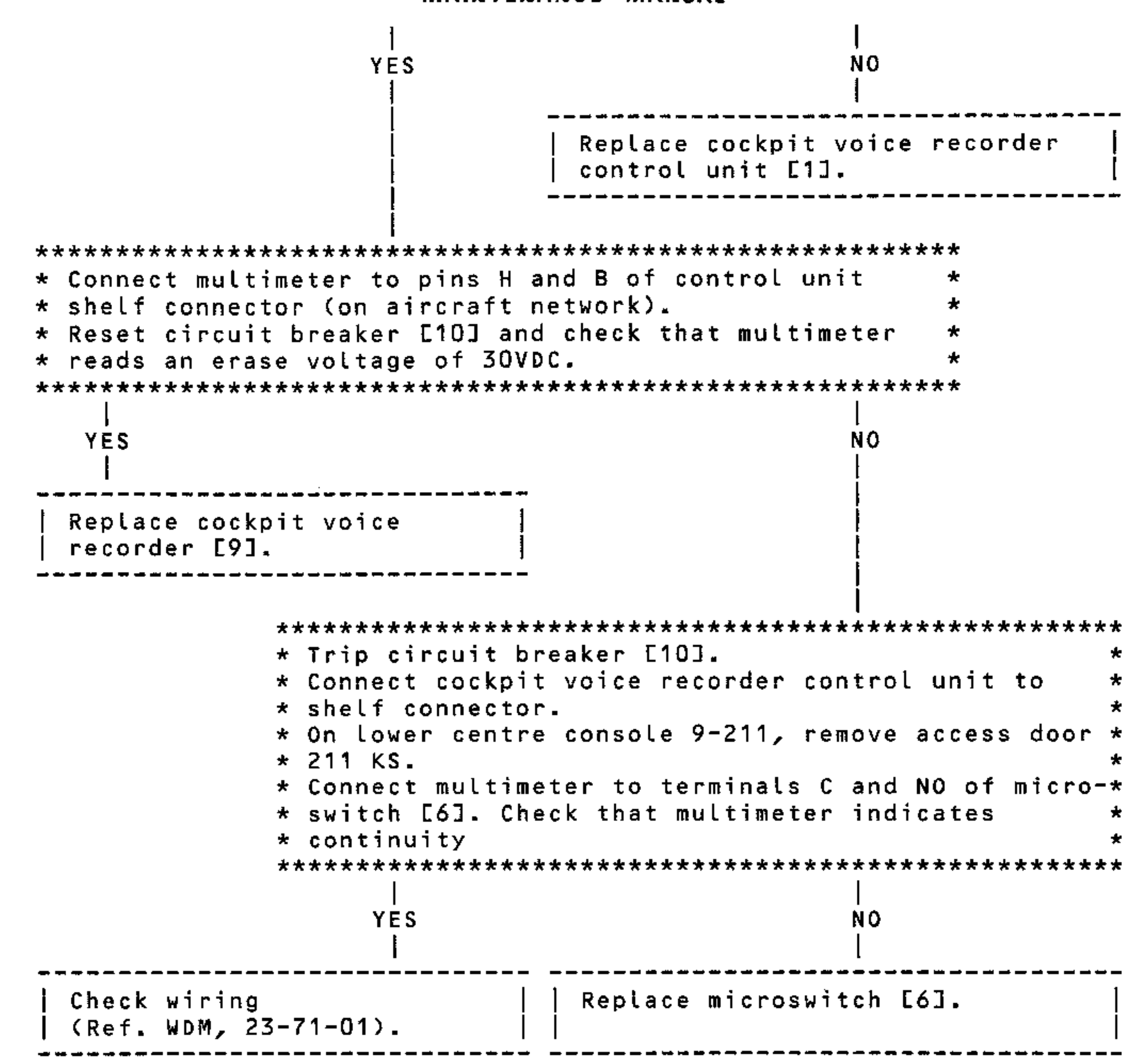


Chart 106 (Sheet 2 of 2)

* CHECK MICROSWITCH [6].

GROUND EQUIPMENT REQUIRED	
DESCRIPTION	PART NO.
MULTIMETER	

* Trip circuit breaker [10].
* On lower centre console 9-211, remove access door 211KS.
* Connect multimeter to terminals C and NO of microswitch [6].
* With brake selector lever placed in NORM position, check that multimeter indicates discontinuity.

YES

Check microswitch travel and adjust if required (Ref. 23-71-42, Removal/Installation).

NOT OK

Replace microswitch [6].

Chart 107

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF.	
					MAINT. TOPIC	WIRING DIAGRAM
[1] Cockpit voice recorder control unit		8-214	R187	Flt Cpt	23-71-13 R/I	23-71-01
[2] Captain's audio selector panel		7-211	R53	Flt Cpt	23-41-21 R/I	23-71-01
[3] First Off. audio selector panel		7-211	R54	Flt Cpt	23-41-21 R/I	23-71-01
[4] Flight Engineer's audio selector panel		8-214	R55	Flt Cpt	23-41-21 R/I	23-71-01
[5] Area microphone		4-211	R189	Flt Cpt	23-71-41 R/I	23-71-01
[6] Microswitch	211 KS	9-211	R190	Flt Cpt	23-71-42 R/I	23-71-01
[7] Circuit breaker 28VDC		1-213	G295	Map Ref. M 18	24-50-00 R/I	23-71-01
[8] Relay	123 AB	3-123	G317	Equipment bays	32-00-00 R/I	23-71-01
[9] Cockpit voice recorder	244 ES	6-244	R186	Rear electronics rack	23-71-52 R/I	23-71-01
[10] Circuit breaker 115VAC		2-213	R188	Map Ref. G 18	24-50-00 R/I	23-71-01
[11] Circuit breaker 28VDC		1-213	R89	Map Ref. K 19	24-50-00 R/I	23-51-01 23-51-11
[12] Circuit breaker 28VDC		3-213	R90	Map Ref. H 2	24-50-00 R/I	23-51-01 23-51-11
[13] Captain's jack panel		1-211	R57	Flight compartment	23-41-41 R/I	23-51-01

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ITEM No. AND DESCRIPTION	ACCESS PANEL	PANEL/ ZONE	EQUIP. IDENT.	POSITION	MANUAL REF. MAINT. TOPIC	WIRING DIAGRAM
[14] First Officer's jack panel		1-212	R58	Flight compartment	23-41-41 R/I	23-51-01
[15] Flight Engineer's jack panel		8-214	R60	Flight compartment	23-41-41 R/I	23-51-01
[16] Interphone Amplifier	216 ES	5-216	R62	RH electronics rack	23-41-33 R/I	23-51-01

Component Identification
Table 101

COCKPIT VOICE RECORDER - ADJUSTMENT/TEST

1. Operational Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	A/C Equipment
1 600 Ohm Headset	
1 Mask for Area Microphone	

B. Prepare

(1) The aircraft is on the ground, with landing gear downlocked and shock absorbers compressed.

(2) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(3) Operate electronics rack ventilation system (Ref. 21-21-00).

(4) Make certain that RAD-INT PTT switch is in the intermediate position :

(a) On Captain's and First Officer's control column handwheels.

(5) On Flight Engineer's panel 8-214, connect a 600 ohm headset to HEADSET 600 OHMS jack on cockpit voice recorder control unit.

(6) Make certain that the following circuit breakers are set :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
No.1 INPH SUP	1-213	R 89	K19
RH UC WEIGHT SW & DOWNLOCK "A" SYS SUP	1-213	G 295	M18

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VOICE REC SUP	2-213	R 188	G18
No.2 INPH SUP	3-213	R 90	H 2

(7) On overhead panel 4-211, place mask on area microphone.

C. Test

(1) Check recording in TEST function.

(a) On cockpit voice recorder control unit on Flight Engineer's panel 8-214, press TEST push-button and check that :
- galvanometer pointer reads "8" at least during approximately 0.8 sec. (one pointer deflection for each track).
- a 600 Hz test signal is heard in headset for 5 sec. (aural signal of 0.8 sec. approximately per track).

(2) Check recording in NORMAL function.

(a) Captain's station.

(a1) On jack panel, connect boomset to corresponding jacks.

(a2) On audio selector panel, place BOOM-MASK switch in BOOM position.

(a3) Speak in boomset microphone and make certain that voice is heard in headset connected to cockpit voice recorder control unit.

(a4) On jack panel, disconnect boomset.

(b) First Officer's station

(b1) Repeat operations described in paragraph 1.C. (2) from (a1) to (a4).

(c) Flight Engineer's station

(c1) Repeat operations described in paragraph 1.C. (2) from (a1) to (a4).

(d) On overhead panel 4-211, remove mask from area microphone.

(e) On panel 4-211, speak into boomset microphone, check that flight compartment transmission is heard clearly at recorder control unit.

D. Close-Up

(1) On Flight Engineer's panel 8-214, disconnect headset from jack on cockpit voice recorder control unit.

(2) Stop electronics rack ventilation (Ref. 21-21-00).

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

2. Functional Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	Aircraft Equipment
2 600 ohm Headsets	
1 Mask for Area Microphone	

B. Prepare

(1) Repeat preparation instructions described in Operational Test, paragraph 1.B.

(2) In zone 244, remove access panel 244ES from RH aft electronics rack.

(3) On shelf 6-244, connect 600 ohm headset to voice recorder MONITOR jack.

C. Test

(1) Cockpit voice recorder self-test.

(a) On RH aft electronics rack (on shelf 6-244), press and release cockpit voice recorder TEST 1 push-button and make certain that :
- The pointer of cockpit voice recorder galvanometer reads "8" at least.
- A 600 Hz signal is heard in headset connected to cockpit voice recorder.

(b) Repeat operation 2. C. (1) (a), pressing and releasing TEST 2, TEST 3 and TEST 4 push-buttons. Results identical.

(c) Repeat operation 2. C. (1) (a), using TEST ALL push-button, and make certain that :
- The pointer of cockpit voice recorder galvanometer reads "8" at least, for periods of approximately 0.8 second duration (one deflection for each track).

NOTE : Switching over from one track to another

results in an interruption of pointer deflection and of aural signal (test duration : approximately 5 sec.). This cannot, by any means, be misinterpreted as a faulty operation condition as, in the latter case, the galvanometer reading would be nul.

(d) On Flight Engineer's console, on panel 8-214, press and release TEST push-button on cockpit that :
- The pointer of cockpit voice recorder galvanometer reads "8" at least, for periods of approximately 0.8 sec. duration (one deflection for each track).
- A 600 Hz signal is heard in headset of cockpit voice recorder control unit, for approximately 5 sec. (aural signal of approximately 0.8 sec. duration for each track).

(2) Check microphone channel recording.

(a) Captain's station :

(a1) On jack panel, connect boomset to corresponding jacks.

(a2) On audio selector panel, place BOOM MASK switch in BOOM position.

(a3) Speak in boomset and make certain that voice is heard in headset connected to cockpit voice recorder control unit.

(a4) On jack panel, disconnect boomset.

(b) First Officer's station

(b1) Repeat operations described in paragraph 2.C (2), from (a1) to (a4).

(c) Flight Engineer's station

(c1) Repeat operations described in paragraph 2.C (2), from (a1) to (a4).

(d) On overhead panel 4-211, remove mask from area microphone.

(e) Speak into boomset microphone and check that microphone output is heard clearly at headset con-

nected to cockpit voice recorder control unit.

(3) Check recording of crew member communications.

(a) Captain's station

(a1) On jack panel connect boomset to corresponding jacks.

(a2) On audio selector panel

- engage INT reception push-button and place potentiometer in intermediate position.
- place INT - R/T PTT switch in INT position.

(a3) Speak in boomset microphone and check that voice is heard clearly in headset connected to cockpit voice recorder control unit.

(a4) On audio slector panel :

- disengage INT reception push-button
- place INT -R/T PTT switch in intermediate position.

(a5) On jack panel, disconnect boomset.

(b) First Officer's station

(b1) Repeat operation described in paragraph 2.C (3) from (a1) to (a5).

B (4) Post FAA Requirement CM42522.

B Check audio output channels from audio selector panels
B including HOT MICROPHONE.

B (a) On Captain's audio selector panel - Press INT
B reception push button and place integral poten-
B tiometer in intermediate position.

B (b) On first supernumery ASP place INT-R/T PTT switch
B in INT position.

B (c) Speak into boomset microphone connected to first
B supernumery's jack panel.

B (d) Check the audio output from Captain's ASP at
B headset connected to CVR control unit.

B (e) On first supernumery's ASP place INT-R/T PTT

B switch in intermediate position.

B (f) On Captain's ASP release INT reception button.

B (g) On Captain's ASP ensure neither INT nor R/T
B are selected.

B (h) Speak into boom microphone of headset connected
B to Captain's jack panel.

B (i) Check the audio output from the Captain's ASP
B at headset connected to CVR control unit.

B (j) Repeat test (a) thru (i) for First Officer's
B and Engineer's station in turn.

B (5) Check bulk erase function

(a) On lower centre console 9-211, place NORM-EMERG-PARK brake selector lever in the PARK position.

(b) On Flight Engineer's console, on panel 8-214, press ERASE push-button on cockpit voice recorder control unit, for approximately 0.5 sec. The tape is completely erased within 5 to 10 sec. While erasing is being carried out, a 400 Hz signal is heard.

(c) On lower centre console 9-211, place brake selector lever in the NORM position.

(d) On Flight Engineer's console, on panel 8-214, press ERASE push-button on cockpit voice recorder control unit, for approximately 0.5 sec. and make certain that no erase signal is heard.

D. Close-Up

(1) On RH aft electronics rack (zone 244), shelf 6-244.

(a) Disconnect headset from cockpit voice recorder MONITOR jack.

(b) Install access door 244ES.

(2) On Flight Engineer's console (zone 214) :

(a) On panel 8-214, disconnect headset from HEADSET 600 OHMS jack on cockpit voice recorder control unit.

(3) Stop electronics rack ventilation (Ref. 21-21-00).

(4) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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3. System Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Boomset	Aircraft Equipment
2 600 Ohm Headsets	
1 Mask for Area Microphone	

B. Prepare

(1) Repeat preparation instructions described in Functional Test, paragraph 2.B.

C. Tests

(1) Cockpit voice recorder self test.

Repeat operations described in Functional Test, paragraph 2.C. (1).

(2) Check bulk erase function.

(a) On lower centre console 9-211, place NORM-EMERG-PARK brake selector lever in the PARK position.

(b) On Flight Engineer's console, on panel 8-214, press ERASE push-button on cockpit voice recorder control unit, for approximately 0.5 sec. The tape is completely erased within 5 to 10 sec. While erasing is being carried out, a 400 Hz signal is heard.

(c) On lower centre console 9-211, place brake selector lever in the NORM position.

(d) On Flight Engineer's console, on panel 8-214, press ERASE push-button on cockpit voice recorder control unit, for approximately 0.5 sec. and make certain that no erase signal is heard.

(e) On lower centre console 9-211, place brake selector lever in the PARK position.

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(f) On panel 1-213, trip RH UC WEIGHT SW & DOWNLOCK "A" SYS SUP circuit breaker G295 (map ref. M18).

(g) On Flight Engineer's console panel 8-214, press ERASE push-button on cockpit voice recorder control unit, for approximately 0.5 sec, and make certain that no erase signal is heard in headset.

(h) On panel 1-213 reset circuit breaker G295 (Map ref. M18).

(3) Check microphone channel recording.

(a) Repeat operation described in Functional Test, paragraph 2.C. (2).

(4) Check recording of crew member communications.

(a) Repeat operations described in Functional Test, paragraph 2.C. (3).

(5) Play Back

For play of the whole recording, the cockpit voice recorder must be removed to workshop (Ref. 23-71-52, Removal/Installation).

D. Close-Up

(1) Repeat close-up operations described in Functional Test, paragraph 2.C. (2).

COCKPIT VOICE RECORDER CONTROL UNIT - REMOVAL/INSTALLATION

1. General

Cockpit voice recorder control unit R187 is installed on Flight Engineer's panel 8-214.

2. Remove

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Blanking Plugs/Caps for Connectors	
Blanking Plates for Ventilation Outlets if necessary	

B. Prepare

(1) Trip, safety and tag the following circuit breaker located on panel 2-213.
VOICE REC SUP (R188), map ref. G18

C. Remove

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.D.

D. Preparation of Replacement Component

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.E.

E. Install

(1) Refer to 23-00-00, Removal/Installation, paragraph 2.F.

F. Close-Up

(1) Remove safety clip and tag and reset circuit breaker tripped in paragraph 2.B.(1).

(2) Carry out operational test of control unit (Ref. 23-71-00, Adjustment/Test).

AREA MICROPHONE REMOVAL/INSTALLATION

1. General

The area microphone located on overhead panel 4-211 provides for permanent recording of conversations and warnings in flight compartment on one channel of cockpit voice recorder magnetic tape.

2. Area Microphone

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	

B. Prepare

(1) On panel 2-213, open, safety and tag VOICE REC SUP circuit breaker (R 188) (Map Ref. G 18)

(2) Release and hinge down the rear switch panel 4-211-3 which is part of the overhead panel 4-211 (Ref. 31-11-00, Description and Operation)

C. Remove (Ref. Fig. 401)

(1) Disconnect aircraft connector (3) from area microphone connector (4)

(2) Remove the four screws (5) taking care to hold microphone (2)

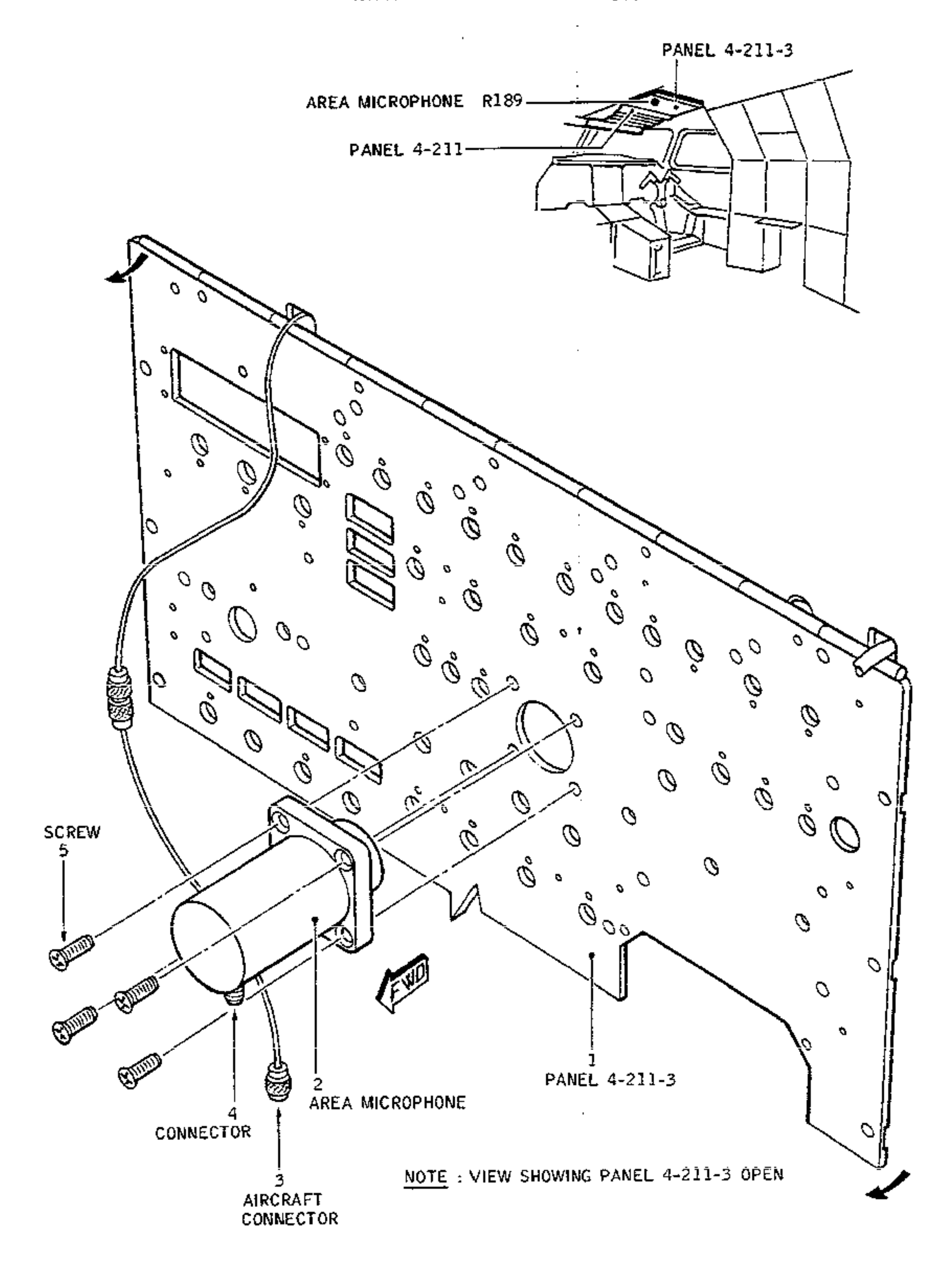
(3) Remove microphone (2) from panel (1), taking care not to damage the adjacent cables.

D. Preparation of Replacement Component

(1) Make certain that area microphone housing in panel 4-211 is clean and clear.

(2) Visually check that area microphone and connector are in good condition.

(3) Make certain that aircraft wiring and connector are in good condition.



Area Microphone Removal/Installation
Figure 401

E. Install
(Ref. Fig. 401)

(1) Position area microphone (2) in housing in panel 4-211-3 (1) with connector looking downwards.

(2) Hold microphone and install the four screws (5) Tighten screws.

(3) Connect aircraft connector (3) to area microphone connector (4)

(4) Position panel 4-211-3 and make certain that area microphone connector is correctly positioned forwards.

F. Tests

(1) Test area microphone (Ref. 23-71-41, Adjustment/Test).

G. Close-Up

(1) Install panel 4-211-3 (Ref. 31-11-00, Description and Operation)

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AREA MICROPHONE - ADJUSTMENT/TEST

1. General

This adjustment/test procedure provides a rapid check of the area microphone after removal/installation or replacement.

2. Adjustment/Test

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
1 Headset (600 ohms)	

B. Prepare

(1) The aircraft is on the ground with landing gear down-locked and shock absorbers compressed.

(2) Remove safety clip and tag and reset VOICE REC SUP circuit breaker R188, map ref. G18, on panel 2-213.

(3) On Flight Engineer's panel 8-214, connect headset to jack on cockpit voice recorder control unit.

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(5) Operate electronics rack ventilation (Ref. 21-21-00).

C. Test

(1) On panel 4-211, speak into area microphone and check that voice is clearly received at headset connected to cockpit voice recorder control unit.

D. Close-Up

(1) On Flight Engineer's panel 8-214, disconnect headset from cockpit voice recorder control unit.

(2) Stop electronics rack ventilation (Ref. 21-21-00)

(3) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

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MICROSWITCH - REMOVAL/INSTALLATION

1. General

Microswitch R190 activated by the brake selector lever applies an erase signal to cockpit voice recorder magnetic tape when the aircraft is on the ground, brake selector lever being placed in PARK position.
The purpose of this removal/installation is to give instructions for replacement and adjustment of microswitch to obtain correct operation of the control linkage.

2. Microswitch

A. Equipment and Materials

DESCRIPTION	PART NO.
Electrical Ground Power Unit	
Circuit Breaker Safety Clips	
Lockwire	
Multimeter	
600 ohms Headset	

B. Prepare

(1) On panel 2-213, trip, safety and tag VOICE REC SUP circuit breaker R188, Map Ref G18.

(2) On lower centre console 9-211 :

(a) Place brake selector lever in NORM position.

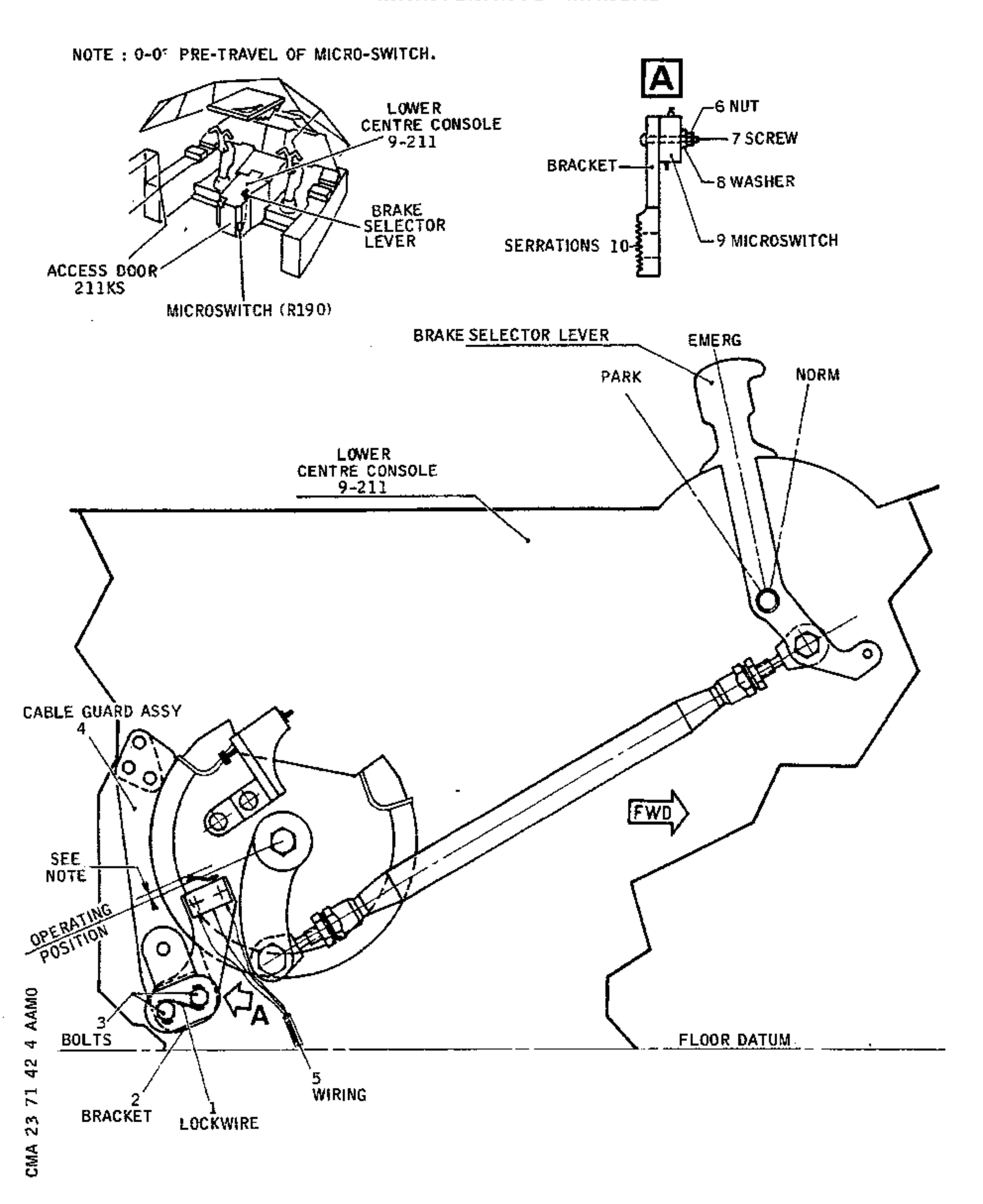
(b) Remove access door 211KS.

C. Remove (Ref. Fig. 401)

(1) Cut and remove lockwire (1) to free the two bolts (3).

(2) Remove the two bolts (3) and hold bracket (2) on cable guard assembly (4).

(3) Remove bracket 2.



Microswitch - Removal/Installation
Figure 401

(4) Disconnect wiring (5) from microswitch.

(5) Remove nuts (6), screws (7) and washers (8) and retain for installation.

(6) Remove microswitch (9) from bracket (2).

D. Preparation of Replacement Component

(1) Connect a multimeter between terminals C and NO of new microswitch, press contact lever and check continuity. Release microswitch contact lever, there is discontinuity.

(2) Disconnect multimeter.

E. Install

(1) Install microswitch (9) on bracket (2) and secure with screws (7), washers (8) and nuts (6).

(2) If necessary, adjust travel of complete parking brake control linkage in centre console (Ref. 32-44-00, Adjustment/Test).

(3) Connect wiring (5) to microswitch.

(4) Install bracket (2) in fully down position on cable guard assembly (4). Install the two bolts (3) and tighten lightly.

F. Adjust

(1) Connect a multimeter between terminals C and NO of microswitch.

(2) Place brake selector lever in PARK position.

(3) Loosen the two bolts (3) attaching bracket (2).
Move bracket upwards serration by serration till there is continuity.
Continue to raise bracket (2) two serrations more, then fully tighten bolts (3) and safety with lockwire (1).

(4) Place brake selector lever in NORM position : the multimeter reads discontinuity.

(5) Disconnect multimeter.

G. Test

(1) The aircraft is on the ground with landing gear down-locked and shock-absorbers compressed.

(2) On panel 2-213, remove safety clip and tag and reset VOICE REC SUP circuit breaker R188, Map Ref G18.

(3) On panel 1-213, make certain that RH UC WEIGHT SW-A circuit breaker G295, Map Ref N18 is set.

(4) Connect electrical ground power unit and energize the aircraft electrical network (Ref. 24-41-00, Servicing).

(5) Operate electronics rack ventilation (Ref. 21-21-00).

(6) On panel 8-214, on cockpit voice recorder control unit :

(a) Connect a headset to jack

(b) Press ERASE push-button : no erase signal heard in the headset.

(7) On lower centre console 9-211, place brake selector lever in PARK position : a 400 Hz erase signal is heard in the headset.

(8) On lower centre console 9-211, place brake selector lever in NORM position : the erase signal is no longer heard in the headset.

H. Close-Up

(1) Stop electronics rack ventilation (Ref. 21-21-00).

(2) De-energize the aircraft electrical network and disconnect electrical ground power unit (Ref. 24-41-00, Servicing).

(3) Disconnect headset from jack on cockpit voice recorder control unit.

(4) On lower centre console 9-211, install access door 211KS.

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COCKPIT VOICE RECORDER - REMOVAL/INSTALLATION

1. General

The cokcpit voice recorder (R186) is installed in RH aft electronics racks, on shelf 6-244.

2. Removal/Installation

A. Equipment and Materials

DESCRIPTION	PART NO.
Circuit Breaker Safety Clips	
Electrical Connector Plugs/Caps	
Outlet Blanking Plug	

B. Prepare

(1) Trip, safety and tag the following circuit breaker :

SERVICE	PANEL	CIRCUIT BREAKER	MAP REF.
VOICE REC SUP	2-213	R188	G18

(2) On RH aft electronics rack, remove panel 244ES to gain access to shelf 6-244.

C. Remove

Refer to paragraph 2D. (23-00-00, Removal/Installation).

D. Preparation of Replacement Component

Refer to paragraph 2.E (23-00-00, Removal/Installation).

E. Install

Refer to paragraph 2.F. (23-00-00, Removal/Installation).

F. Test

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(1) Remove safety clip and tag and reset circuit breaker previously tripped in paragraph 2.B. (1).

(2) Carry out an operational test of the cockpit voice recorder system (Ref. 23-71-00, Adjustment/Test).

G. Close-Up

Install panel 244ES on RH aft electronics rack.

END OF THIS SECTION

NEXT